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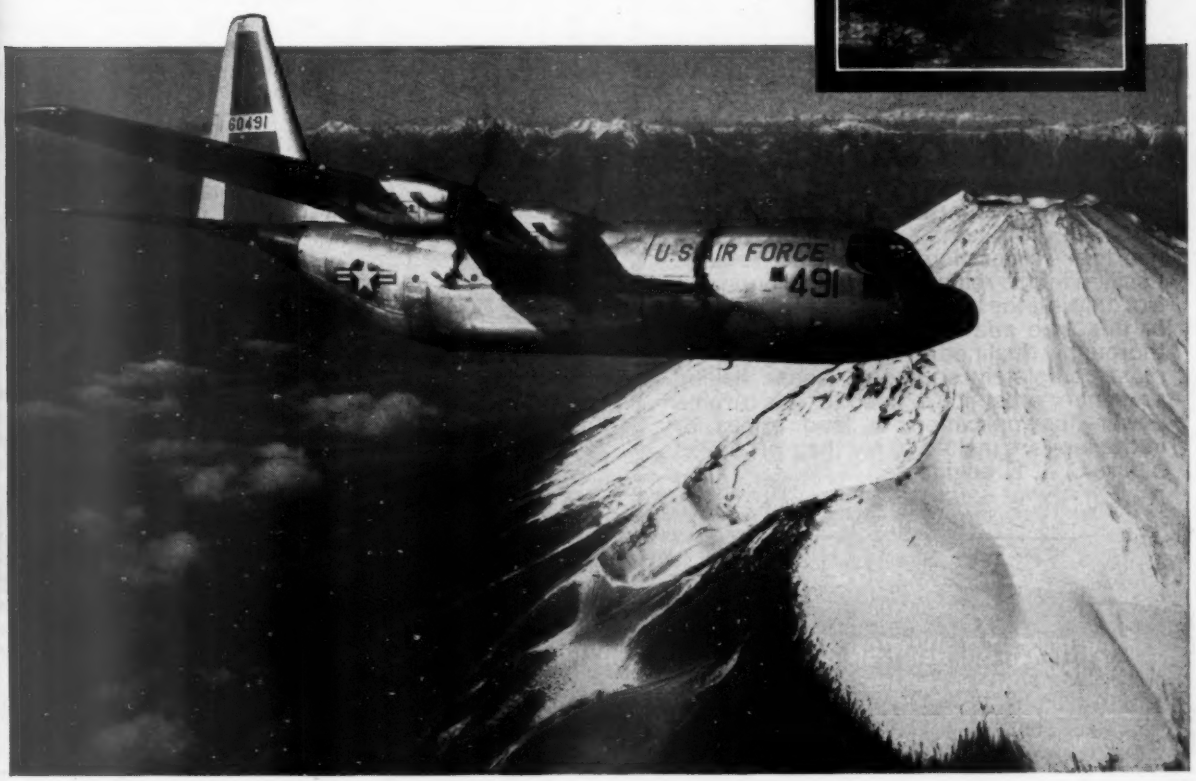

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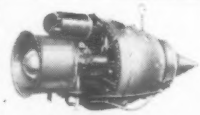
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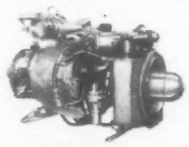
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In My Opinion

Missile Sites

The layout of my article on construction of missile sites in your June 1958 issue was most impressive and very flattering to me personally. But personal considerations aside, let me say that the Corps of Engineers is happy to have this story printed because the missile site construction story has not been adequately told. The Corps' $100 million construction job at Cape Canaveral has received very little attention although the construction features there are most extraordinary. Even your article in your May issue, "Cape Canaveral—Doorstep to Space," which, incidentally, was one of the most interesting and comprehensive popular accounts I have read on Cape Canaveral, omitted reference to the Corps of Engineers as the fourth indispensable member of the Cape Canaveral Team. You mentioned AFMTC, PAA and RCA.

I am gratified, therefore, to have ARMED FORCES MANAGEMENT feature this rather comprehensive story of the Corps' role in missile site construction because your magazine is an excellent means of communication among individuals at the higher administrative and management levels in defense. I am well aware of the many benefits to be gained when the whole of defense management clearly understands the "how and why" of our construction effort in the missile field.

Please accept my thanks for what I consider to be a genuine service.

Maj. Gen. W. K. Wilson, Jr., USA
Deputy Chief of Engineers
for Construction
Army Corps of Engineers

MTMA and MATS

Thank you for . . . a copy of your editorial about MTMA published in your July edition. The editorial is as provocative as it is profound. I am sure, though, that where you say we "exploit commercial carriers," in the second paragraph, you are using the world 'exploit' in its kindest sense.

I would not want to comment on your proposal without giving it the thorough study and thought it deserves, and which you have obviously done. However, I feel all will agree you have forcefully presented your proposal and your reasons in a most interesting and effective manner.

Maj. Gen. F. S. Besson, Jr., USA
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Department of the Army

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ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

AUGUST, 1958

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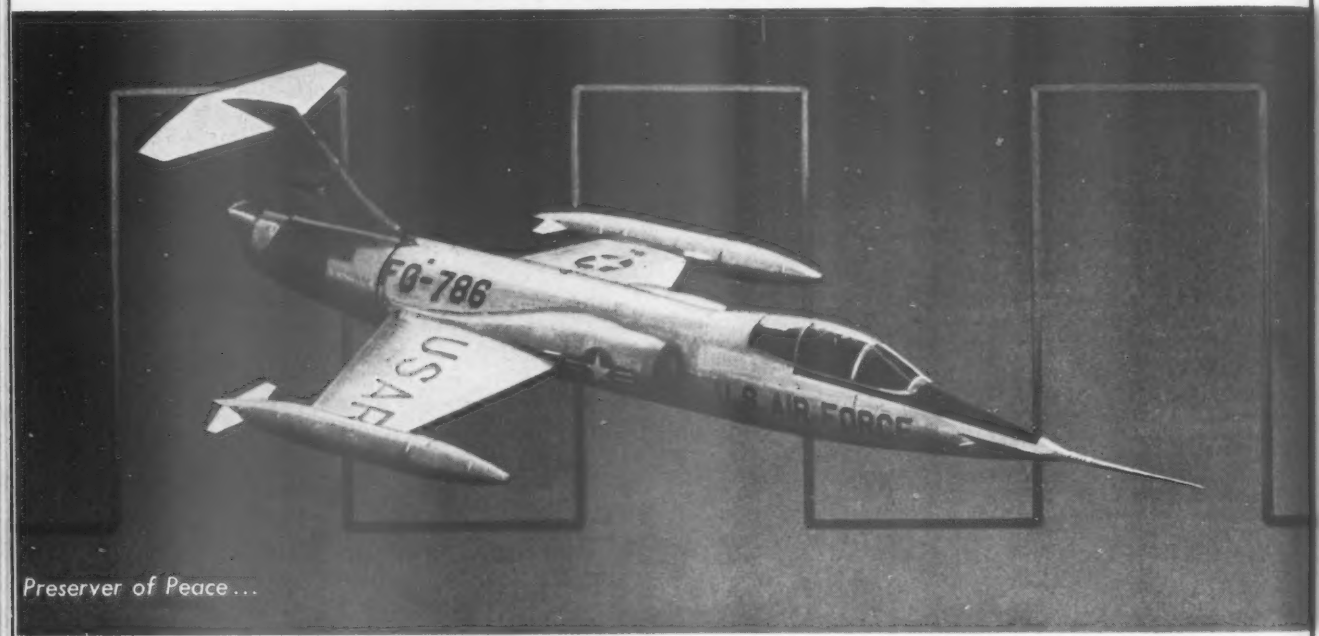

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Developed and produced by Radio Corporation of America for the U.S. Air Force, the Time-Division Data Link system employs digital transmission for the transfer of control information between ground environments and airborne systems. The use of digital techniques of high-speed computers brings the concept of automation to the field of communications and guidance of airborne weapons systems. Applications of the system are: *ground controlled intercept, missile guidance and control, return to base, en route air traffic control, automatic landing systems, tactical support.* This new RCA development is compatible with NATO Data Transmission Specifications, and is of important significance both to military and civilian flying.

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CAMDEN, N. J.

EDITORIAL

The Real Threat to National Security

THE real threat to national security is not, contrary to the headlines, the revolution in Lebanon. Nor is it Russia's huge land army. Nor, for that matter, is it the operational intermediate range ballistic missile the Communists have in their arsenal. These are only parts of the picture—obvious segments for which there is a relatively simple solution.

The real threat to our national security does not lie with our potential enemies at all, but with ourselves. Our national defense does not begin with a strong military force. It begins with a strong and dynamic-thinking government which does not sit in tense anxiety waiting for a potential enemy to do something before it reacts.

It is a great deal more effective, and a great deal less expensive, to employ a police force to prevent crime rather than attempt to "arrest" the criminals after the crime is committed. If you listen to our national leaders, this is what our large peacetime military forces are for—to prevent war. But, in the next breath, they invariably deny their own contention by labelling SAC, STRAC, missiles and all the rest a "retaliatory" force. This is an after-the-fact policy which makes the word "preventive" little more than a bit of diplomatic semantics. It is a threat to no one except nations already weaker than the U.S.—and these are not potentially our enemies, anyway.

Because of this "second-best" idea the Communists need only to keep throwing different kinds of problems at us until our resources are spread so thinly that the winning percentage is decisively in their favor. They apparently fear our massive retaliatory power far less than we would like to think. (According to Raymond L. Garthoff, in his just-published book *Soviet Strategy in the Nuclear Age,* they lost, in a very short period in 1941, control of 40% of their population, 60% of their coal, iron, steel and aluminum production, 40% of their grain production, 95% or more of certain key military industries, 4 million soldiers and nearly two-thirds of their tanks and aircraft. In other words, to quote him, they survived an attack comparable to nuclear destruction—"survived and won.")

The Navy has already been forced to cut its planned procurement of aircraft and ships for next year. Our small, by comparison, Army has had to accept what amounts to another reduction in force. The Air Force is being pushed, by lack of dollars, into a business-as-last-year operation when it has already been decided they must expand and disperse.

It is time we jumped off the merry-go-around. Military preparation can no longer afford even the bare minimums—if we continue to base preparation on the uncertain, inconclusive policy of playing international tensions by ear. The Services have been given too many situations to defend against and there just isn't enough cash in the till to handle the job.

The dollar sign is driving us to our own destruction. Nor can the Services, themselves, handle the whole problem. They do have, naturally, control of the efficient management of their own plans and programs. In running their businesses they can do a great deal to chip away at rising prices. Considering that up until about 10 years ago operating a military service as a business was considered, at best, secondary, they have made amazing strides. They plan a great many more.

It is not generally recognized that under the purifying heat of ulcer-provoking experience, the Services have developed some of the smartest businessmen in the country. (Case in point: Gen. E. W. Rawlings, head of the Air Materiel Command, whom the Air Force has kept in the job since 1951—mainly because he is the fountainhead for what amounts to a revolution in Air Force logistics operations.)

They still have a great deal to do: stop feather-bedding budget requests; delegate authority farther down the line to lessen decision time lags; standardization of forms, methods, even materiel; improve personnel relations, i.e. career incentive based to a greater degree on performance and less on "serving out your time."

But their own possible management miscues are only part of the trouble. There are other causes.

Deficit government financing is one. When the U.S. government operates in the red, prices go up. Military hardware costs more and the following year Defense raises their budget. Red ink flows again and prices take another jump—and yet in military effectiveness we're right where we were when we first climbed on the treadmill.

Another: an American public which still does not realize, apparently, that we are fighting the war now, that the result of any shooting which may come later will be anti-climactic. Examples: the labor union which demands, and receives, a wage raise without giving the U.S. economy a corresponding increase in productivity; the industries which cry to their Congressmen when they miss out on a government contract instead of trying to make their product more competitive.

The solution to the big puzzle is going to come only when the President, Congress, the State Department give the Services a simple, firm framework within which to do their military planning.

Bill Borklund

Why Army's Atlantic Ports Have 'Management Control'

The Commander of U.S. Army Transportation Terminal Command, Atlantic has one goal in mind—management by exception. This is how, under the Terminal Command Concept, he believes the goal will be realized.

by Maj. Gen. Evan M. Houseman
Commanding General,
U.S. Army Transportation Terminal Command, Atlantic

THE area covered by the U.S. Army Transportation Terminal Command—Atlantic is rather extensive. We control the shipment of military cargo and personnel through all of the major and lesser ports along the entire Atlantic coast from Maine to Florida, as well as the Great Lakes; and our mission includes the re-supply operations for Air Force installations in the Far North.

To properly control this extensive operation, sound and effective management is an obvious necessity. If you will accept my definition of what I mean by management—*the logical control of persons and things toward the most effective performance of the mission*—then I can state that I feel we have taken a giant step toward sound and effective management. I know, at least, that I have a firm basis for it, a working method of determining weaknesses in it, and a flexibility to accommodate necessary changes.

In developing and expanding our method of management, I have one goal in mind: to achieve for myself the role of *Manager By Exception.*

Many of you are familiar, at least by name, with the New York Port of Embarkation. My Command (abbreviated to "USATTCA") is the successor to the old NYPE, and I believe some details concerning its composition and organization are necessary to an understanding of how it is managed.

USATTCA is a Field Command of the Chief of Transportation. It is organized under a so-called "Terminal Command Concept." This establishes a staff and command headquarters controlling a group of operating terminals. My command headquarters is located at Brooklyn, N. Y., heading up three continental terminal organizations, as indicated in the accompanying map.

One terminal is at Brooklyn, one is at Norfolk, Virginia, and one is at Southport, N. C. Each of these terminals operates within, and controls, a given geographical area as shown on the map. The usual Army Terminal performs a variety of activities which are necessary for the movement of persons or things. These activities include the management of physical facilities as well as the management of traffic. We make use of general cargo piers or wharfs, in-transit buildings and large open areas. We use both commercially-operated and government-controlled properties.

To accomplish fully the specialized activities involved, we must also maintain liaison and resident representation with military and commercial air terminals.

We also have an installation built specifically for the trans-shipment of military explosives. This is our modern ammunition loading terminal at Sunny Point, N. C.

In addition to this stateside organization, I command an operation outside the limits of the United States —the 7278th Transportation Terminal Command. This organization is situated within the enormous area which is outlined on the map.

The mission of this overseas command is to manage and operate water terminals in Northeast Canada and in Greenland, Iceland and Newfoundland, to support the U.S. Air Force and other agencies, and to resupply the Distant Early Warning Line and GAP-PINE radar sites.

In my role as Commander, I, in essence, am manager of this organization. In order to manage properly elements from Thule, Greenland, to Miami, Florida, I must control. I must control through others. I must be able to control my people, my funds, and my operational functions. I must have an organization which allows a proper "Span of Control."

If I supervise too many, my control and guidance will be ineffective. If I supervise too few, I will tend to harass my subordinates.

We believe that the Terminal Command, as presently established, has arrived at a happy medium of control. It certainly is an improvement over the old time staff organization, which existed up to November 1955.

We had, then, a Port Commander, who was supported by a General Staff, a Special Staff, Operating Divisions, Subinstallations, and Subordinate Commands. The headquarters was located in Brooklyn, while subports were scattered along the North Atlantic Seacoast. The scattered spread of control, with the multitude of activities reporting to the Commanding Officer, forced him to limit his attention to those places nearest to his headquarters.

As of 1 November 1955, a new Terminal Command Concept was placed in effect. The new headquarters was patterned along directorate lines. This gave me a four-fold span of control, in that I have reporting directly to me a Director of Administration, a Director of Operations, a Director of Services, and a Comptroller.

Also, you will notice, I retain close

(AUTHOR'S NOTE: While this article has been specially prepared for ARMED FORCES MANAGEMENT magazine, it is a digest of several talks given before the students at the Armed Forces Management School at Fort Belvoir, Va.)

at hand two advisors on specialized matters—an Inspector General and a Judge Advocate.

I want to repeat that there are four directors reporting directly to me. Under our concept of Management Control, we look upon control as a function of line management.

There has been a folklore of management developing in many business areas, and probably in some Army thinking, that implies that the primary management of an organization is done by the Comptroller and his management people. Let there be no misunderstanding. I am the top manager in my organization—not the Comptroller.

The Comptroller and his people do have their function of control. I will discuss that in detail later. But under our concept, each one of the four directors is, along with all of his subordinate divisions and branches, a management activity with his own set of management responsibilities.

We have a document (Organization and Policy Manual) which spells out, from a control and managerial standpoint, the basic policies and definite procedures which each directorate is to follow in accomplishing its portion of the terminal command's mission. In each individual terminal, a similar manual exists which, in its turn, defines the responsibilities and procedures of each major terminal division. This document, in effect, allows each directorate to be—to a great degree—directly responsible for managing its own affairs within the scope of policy.

I do not wish to imply that this makes each directorate an independent unaffiliated agency. There must be proper communication and interrelationship between all directorates and divisions, and to assure this I have a Deputy Commander or Chief of Staff who acts as my alter-ego and coordinates them for me.

Directors' Job

The Director of Operations get each year from the Office of the Chief of Transportation (OCT)—far ahead of the day of accomplishment—our basic workload guidance. This is broken down into personnel movements and cargo movements, both by air and water. These directed actions are referred to collectively as our basic operating program.

Upon receipt of this program, the Operations Directorate breaks these figures down into workloads, and forwards them to the subordinate terminals. The factors that enter into the decisions for breakdown are varied and many. They include, in part, such things as:

Terminal Capability
Freight Rates
Shipping Availability
Geographic Destination

Let me give an example of how these various factors enter into cargo control.

Despite the fact that U.S. continental freight rates for shipment of cargo to Eritrea may be favorable to Charleston, S. C., shipping for this destination is available only in New York. Hence, Operations has to plan for all such shipments to be made through New York.

This initial step on the part of Operations, which is part of its basic programming, is only the beginning of its managerial responsibilities. The workload, as initially presented to us by OCT, represents an advance estimate of worldwide situations; so that movements of troops and materials are subject to change, causing the program to change from month to month.

Throughout the year, it is necessary for Operations to assiduously monitor every facet of the movement of cargo and personnel. In this procedure, our Director of Operations is a manager. He does not dictate, as you can see, the total program which he receives. This is OCT's function. He does manage where he reduces a worldwide program to a terminal support program based upon the planning factors I mentioned above.

For example, take a troop movement emanating from Fort Benning, Georgia. All other things being equal, the distance factor would indicate that personnel should be moved from a

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Duluth
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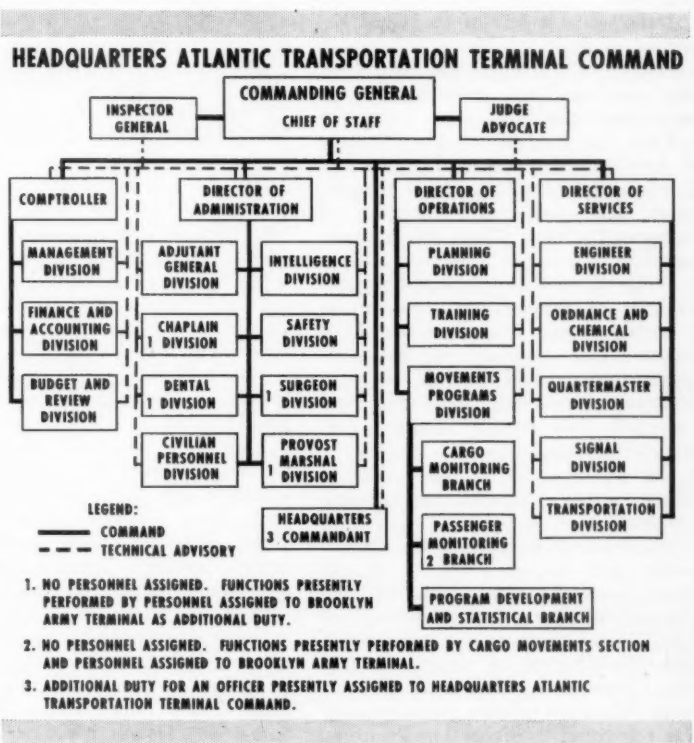


southern terminal rather than from a northern terminal. If, concurrently, some of the equipment for this movement is emanating from an ordnance depot in the north, it might be preferable that this portion of equipment be shipped from a northern terminal.

The Director of Operations becomes a manager at such times as weekly tonnage release figures are received from the terminals. Here he can determine where, for the sake of greater balance, certain cargo should be shipped from one rather than another terminal.

Thus, for instance, we have on occasion diverted dense cargo from Brooklyn to Wilmington, N. C. to make possible a balanced load of vehicles to Casablanca, North Africa.

We have been talking about the Management exercised by my Director of Operations. I know that I have created the impression that I consider the operations part of the command the pivotal segment. This impression is intended.

But I do not mean to imply that the other directorates do not have their important functions. They do have, within their own fields, very definite managerial responsibilities.

Their entire managerial thinking is in terms of the support which they will have to furnish the operational segment. But their whole scheme of existence, to a great degree, centers around the things which Operations does.

Why Delegation

I shall take a few of the more important of these subsidiary activities in turn to explain how, within themselves, they manage their responsibility in supporting operations.

First, let us look at the Director of Services. He is primarily interested in contractual services, major maintenance and repair, and the supply and equipment picture. These are quite diversified.

While all of these projected responsibilities of Services are planned on a yearly basis, the fluctuations of monies and changes in operating requirements demand that all of these programs be closely monitored and managed. This requires many managerial decisions.

For instance, let us follow thru a recent actual engineer management problem.

In planning the FY 1958 Maintenance and Repair Program, Sunny Point Army Terminal submitted the requirements for certain dredging. The USATTCA Engineer, in conference with the Director of Operations and the Comptroller, concurred in this need. When the priority list of projects was submitted to higher headquarters, Washington directed that this dredging item of $315,000 be deferred.

The Director of Services and his Engineer had to determine whether Washington's decision was logical or not. This again required a conference including my Engineer, my Director of Operations and my Comptroller.

This conference developed that the non-accomplishment of this dredging would hinder berthing operations to a dangerous degree. Hence, my Director of Services recommended to Washington that the project for this dredging operation be accomplished despite its cost.

Thus you see, while my Director of Services manages his own business, his decisions are contingent upon the needs of Operations.

The Director of Administration has a three-fold responsibility. He is responsible for a multitude of routine clerical matters such as the collection and dissemination of mail, telegrams, and various printed material.

Second, he administers the Military Personnel Program for the command.

And his third and greatest responsibility is the Management of Civilian Personnel matters.

I need not stress the scope or details of the clerical end of this activity since it is similar to the mail and records section of any large organization.

His second function, the Management of Military Personnel, while important, has become an ever decreasing job volume-wise in light of the present trend toward a diminution of military personnel and a build up of civilian personnel.

By way of illlustration, as of the present date, the total military personnel of this command, stateside, is 113 officers, 234 enlisted men. But our civilian personnel force consists of 3,356 persons. We have, in addition, a contractual civilian work force which represents 30% of our yearly costs.

Our civilian personnel management activities are programmed on both an immediate and a long range basis, and are designed not only to develop but to maintain a civilian work force which is qualified and which is encouraged to achieve productivity at the least possible cost.

The major programs for which my civilian personnel division chief is responsible are: Performance Appraisal, Promotions, Career Guidance, Placement, Training, Sick and Annual Leave, Incentive Awards, and Communication Media (publications).

These programs are all integral parts of what are generally understood as good management aids. They all tend to make the employee more stable, more efficient, and certainly more contented with his job. I will not elaborate on these since they are normal to all organizations, whether they be civilian or military, and analogous to most Army installations.

The Comptroller

As you recall, I indicated that we do not subscribe to the legend which says that the primary management of an organization is done by the Comptroller and his management people. You would certainly be justified in asking, then, what does the Comptroller control and what do his management people manage?

We are confronted every year with a program. This program defines the number of tons and the number of people that we are responsible for moving. In performing this mission, the Operations people, the Services people, the Administrative people, and certain specialists such as the Judge Advocate and Inspector General all have functions to perform. They all have personnel. They all use a certain amount of supplies. They all occupy office space which has to be heated, lighted, kept clean, painted and repaired. All of this costs money. And certainly I would be a very bad manager if I did not start figuring, at the beginning of a year, just what these costs are going to amount to and, of course, where the money is coming from.

It is in this function of estimating costs and preparing a budget that the first work of the Comptroller enters into the picture. Of course, this function in effect really makes him a coordinator rather than a Comptroller. And in this function, he and his multitude of men and women with their pencils and machines endeavor to make a logical balance among the necessities of the job, and to come up with a fairly accurate budget.

Once this budget has been approved and becomes a reality in dollars and cents, the Comptroller then assumes his function as a manager. In the course of the ensuing year, it is the responsibility of his office to balance expenditures against availability of funds.

This is not as simple as it sounds. To begin with, the budget is a before the fact estimate, based upon historical data, including such things as existing contractual costs, and based upon an estimated program of work. In the course of a given year, business trends and conditions may increase the cost of contractual operations and of material and supplies. During the course of the year, military conditions on a worldwide basis may vary the workload. For example, we may ship fewer passengers and more ammuni-

tion to a specific area. These variances occur on a continuing basis.

This creates a true management problem for the Comptroller's office; fund allocations must be adjusted to meet these variances. The annual budget, which is set long before the beginning of a fiscal year, must be constantly reviewed and constantly rearranged to meet varying needs.

But we still have not answered the question "What do those people who are labeled 'Management' actually do within the Terminal Command?" I do not like to label them with the antiquated title of efficiency experts. This went out of good usage many years ago, but to a degree the title is appropriate.

Since April 1955 we have been

Brooklyn Army Terminal is Port of Embarkation for all North Atlantic Army traffic.

under a financial system known as the Army Industrial Fund. Despite the reams that have been written on the importance of industrial funding, it is not a miracle drug. It is simply a system of funding and accounting which allows the Commander to analyze, down to the lowest working level, the absolute cost of his operation in every detail. This system analyzes costs, not only down to a working cost center, but even allows for an analysis of individual work units within the same cost center.

With this information available, it is now possible for my Management people to determine the efficiency, in terms of man-hours and cost, of the lowest level of operation.

By means of surveys, they can determine what something should cost, in terms of people and dollars, and also determine what it actually has cost.

The functions which are allotted to the Management segment of the Comptroller's office are review and analysis, management studies, and engineered standards.

A great many of these functions are routine. A great many of them are created to give us the capability to generate reports for higher headquarters. But there is one function which is a money-making management device. I refer to the last one—The Engineered Performance Time Standard segment.

This is a program of surveying in order to produce accurate and basic standards, against which we gage the efficiency of all levels of operation in terms of man-hours and dollars expended. This program has really only commenced within my command. We are still existing on standards which are historical.

In other words, 70 percent of the standards we use in gaging the efficiency of working levels are statistical. However, we have given an impetus in the last year and a half to our management surveys, and are pushing the idea that if we are ever to arrive at absolute analyses of the working man's cost to us, we must have Engineered Standards. We have completed only a few segments of the command, but already we have been able to attain, in these areas, a saving of 28%.

The need for absolute gages is becoming more and more necessary. Each year, our budget is hacked at by Washington, and this is a continuing process. On the other hand, personnel costs, the cost of material and contractual costs, are ever increasing in step with the inflationary spiral of the world. In addition, our workload is not decreasing.

Consider these factors and I think you will appreciate the necessity for us to discover how to do our jobs with fewer people. It is in this field of determining how to get more for less that our Management Experts are beginning to be of help and eventually will be of invaluable assistance.

Under these four directors are assembled all of the other specialized activities which would have individual and specialized managerial problems.

These specialized division chiefs have first recourse, in problem areas, to their respective directors. Each director in turn has a management pattern established for him which is very carefully detailed in the Policy and Operating Manual. A major portion of the problems which arise have their definition and their solution in established and proven policy.

Hence, with the multitude of problems which are presented to the director, there are few which are not immediately solvable. The exceptional problem in management which may require special coordination, deviations from policy, or change in policy, are the only ones which he actually has to bring before my Chief of Staff and myself.

The exceptional problem can often be solved by a conference of the various directorates involved. There are some, however, which land in my lap. These are the problems which require authority from higher headquarters or coordination with parallel commands.

I think you can realize that I am grateful for the fact that the organization of my command and the establishment of sound policy and procedures for each directorate of my staff serve, in a way, to protect me. If these management patterns did not exist in an established and practical form, my own workload would be impossible. I would be bombarded with the minutiae of lower level management, and important management considerations and decisions would undoubtedly go by the board.

Thus I am steadily approaching my goal: to form an organization which will operate so smoothly and efficiently that only the weighty, unusual, or exceptional problems will need to be brought to me to be resolved. When this has been accomplished, I will have arrived at the only type of management which can be effective and workable in a large organization, and will have achieved my aim—to be a Manager by Exception.

Washington Background

AIR FORCE HAS, FOR THE FIRST TIME, taken the problems of the installation engineer into consideration in publishing specifications for a new aircraft. In the past, AF has told potential contractors only that it wanted a plane which would fly so far and so fast and have certain other performance characteristics. In the face of rising costs, increasingly complex installation and supply problems, it has added, in the specifications for the B-70 bomber, that it must be operable from existing B-52 installations and facilities—a clue of things to come.

MILITARY MOVED ONE STEP CLOSER, in late July, to a long-range program to have contractors supply parts direct to the field, rather than buy, stock and ship supplies themselves. Defense Department set up (under instruction No. 3232.7) a standardized format for contractors to report technical information on spare parts. Goal of uniformed procedure for submitting data and standardization is to permit putting it on computer-type equipment, key element of the direct supply program.

ALTHOUGH INTERNATIONAL SITUATIONS HAVE PUSHED military budget headaches off the stage center, all services are still fighting money drought. One problem, which military alone can't solve, is soaring weapons costs—which Navy Assistant Secretary Garrison Norton recently term "fantastic." Another which Navy thinks can be improved is apportionment of funds by Budget Bureau. They want BB to review earlier, claiming it would aid R&D planners in obligating for new projects during early months of fiscal year.

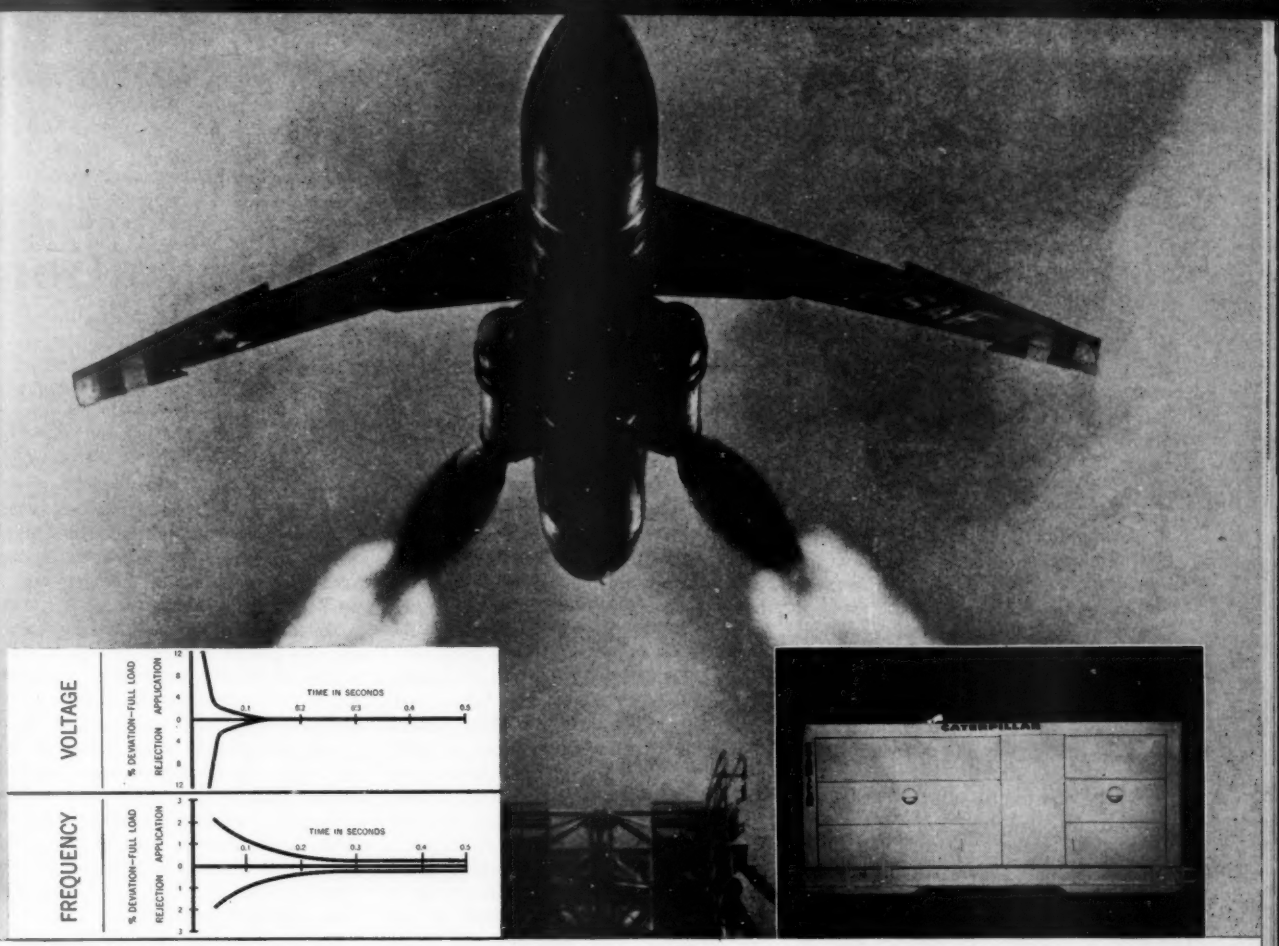
CONGRESS WILL ALMOST CERTAINLY SUBMIT a Pentagon reorganization bill to the White House for approval before they adjourn—and with elections coming up, they will probably close shop in early August. The battle which might have delayed settling the issue never developed.

QUESTION NOW IS WHAT WILL Eisenhower do with the bill? Senate bill, for all intents and purposes, is same as House version—to which he voiced such strong objections. But chances are better than two-to-one he'll take what he can get from Congress this term, and sign the bill. A veto would mean no reorganization bill until next year—because of the time element.

ACTUALLY, WHAT MANY PEOPLE DON'T REALIZE is that the new bill will change the old operation very little. There will be a new title and some shifting of bodies in the research area and the Joint Chiefs of Staff operation will about double in personnel. But the real effectiveness of Pentagon operation, regardless of what form it takes, will still be up to the administrative talents of Defense Secretary Neil H. McElroy. Although the new law will not change much, the hearings which led up to it, say many Washington observers, have been of real help in clearing the air about how Defense should function. Most important beneficiary has been McElroy who has been given an intensive short course in Pentagon administration—something it might have taken several more months of experience to pick up otherwise.

ONE OF THE LONG TERM OBJECTIVES of Pentagon planners is beginning to pay off. Obligations and expenditures are, for the first time, running almost at even levels over the first 10 months of fiscal 1958, according to the DOD's report on spending by budget categories dated April 30. Cumulative expenditures for the 10-month period for military functions only totalled just under $32 billion. Obligations came to $32.9 billion.

PENTAGON HAS PULLED IN ITS FEELERS a little on the proposal to form a single public information office for all three services—mainly because the services are unanimously opposed to the idea. In addition, that somewhat indefinable group known as "The Nation's Press" views any central information group with a good deal of apprehension at the moment, has adopted a wait-and-see attitude. If they don't like the net result (provided there is a single office set up), they wield enough power to cripple it.



The almost instantaneous return to normal of the new low-silhouette Cat power unit under conditions of full-load application, and load rejection (117.4 volts), is shown in the above graph.

Low-silhouette Cat power unit with close voltage regulation is now being used in connection with ground support for jet starting and firing. The 400-cycle phase is specifically adapted to missilry.

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Creative engineering and quality of manufacture have made Caterpillar the diesel leader for more than 25 years. For detailed information on the Cat 60 KW 400-cycle portable power unit with close voltage regulation, send in the coupon below.

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How AMC Handles High Speed Distribution

by Brigadier General E. B. Cassady

Director of Transportation & Services, Headquarters, Air Materiel Command

IN the Air Materiel Command's worldwide chain of logistic operation, high speed distribution has real significance. The ability to respond quickly in both the routine and unusual situations is an intricate part of air-age logistics. Air Materiel Command transporters are dedicated to meeting this challenge every hour of the day throughout the year. Gross figures do an inadequate job of describing the vastness of our distribution responsibilities. The thousands of tons we move monthly to the hundreds of global destinations never assume a routine pattern. Our business is dynamic in nature and we are constantly seeking refinements to meet this demand.

The AMC traffic manager expects to see his ladings cover a wide array of almost anything under the sun. It runs from cotter pins to cleatracks, towers to transistors, organs to ovens and engines to entomology equipment. To move these cargos, the AMC uses all the regular commercial transport networks, plus several innovations of our own fabrication. To serve as a ready identifier, they have been tagged with titles that relate to their areas of performance.

LOGAIR is the specially created system of commercial contract airlift operating over established routes and frequencies for the movement of priority Air Force cargo in the United States. The airline is comprised of about 55 cargo aircraft of both twin engine and four engine configuration, crewed by the contractors and under complete operational control of Headquarters Air Materiel Command, Wright-Patterson AFB, Ohio. This fleet provides daily service to the tactical commander, greatly improving his logistic support and at a ton-mile cost substantially below the national average for commercial air cargo.

In our customer commands, SAC, TAC and ADC, the number of aircraft out of commission awaiting needed parts has constantly decreased in marked degree because of this support. A squadron commander can requisition a vital part from an east coast source and be confident of same or next-day delivery at a remote air base in the southwest. The LOGAIR system presently encompasses 52 Air Force bases.

A central traffic control is maintained over the system from the headquarters in Dayton, Ohio. This guarantees that the system retains a great flexibility by being able to reroute or divert flights throughout the system in almost a matter of minutes. Central Payload Control provides a focal point by which the daily requirements of the system may be met by these flight diversions. Forty-three propellers urgently needed on the west coast for modification of the MATS fleet were delivered by LOGAIR through immediate diversion of six aircraft to the manufacturing plant in Connecticut for pick-up.

LOGAIR has met the unique need of furnishing a dependable air cargo service throughout our continental Air Force structure. Its ability to respond to the fluctuating needs of the logistic picture gives it a characteristic that cannot be bought in common carrier sources. Its cargo interchange, at the several ports where MATS originates its routes, completes the circuit of the Air Force global net. This connecting link provides a continuous control of critical overseas air traffic from origin to aerial port of embarkation, a control not enjoyed when other modes of transportation are utilized. The service demanded by our most precious cargos has found satisfaction in the LOGAIR organization.

Only a small ratio of our total movements enjoys the speedy dispatch of aerial delivery. Items concerned with a routine situation are moved with both economy and service considerations. Every step in our transport activity is geared to evaluate the dollar cost of our traffic management actions. Commanders are cooperating in this work by insuring the placement of requisitions with authenticated needed at destination dates. This information serves as a bona fide basis for management decisions which are allowing us to be "on time with enough."

In our random destination cargos, we use parcel post, freight forwarders, rail and trucking services across the board. We attempt to match service advantages with the consignee's demand, never failing to conscientiously consider the customer's need and incident cost.

In areas of high density traffic, the AMC complements the usually available service with another of its own innovations, the LOGLAND system. This can be described as a series of negotiated arrangements where one or more common motor carriers join to offer a preferred through-service to match the Air Force need. LOGLAND, in a typical instance, provides cargo collection at a central west coast metropolitan point and daily dispatch of through-trailer service to a mid-west Air Force complex.

Expedited distribution on the delivery end of this route is the final step in narrowing the transit time gap. Dollar savings are accrued through minimum consolidation and the reduced inventory levels that are adequate in view of this preferential handling. LOGLAND has proven to be a strong arm in raising our standard of surface transportation.

All AMC transportation activities, including LOGLAND, are performed in cooperation with, and under policies laid down by, the Military Traffic Management Agency (MTMA) in Washington. This agency is part of the single manager philosophy that guides many of the supply and service activities of all branches of the Department of Defense.

Pipelines are an important facet of our day-to-day work, and are gaining prominence every month. High fuel consumption in the jet age has taxed the tank car and truck severely. Although such carriers can handle our

products, we find that real tangible savings are possible in both movement and handling when pipeline facilities are available. The continual growth of the commercial pipeline networks has allowed many new service points with new installations under constant study. Marine transportation of POL products has not been neglected. This command also has a substantial vested interest in the water movement of POL and its products.

In the area of surface transportation to oversea activities, the Air Force is serviced by the Military Sea Transportation Service, which is the single manager for procurement of ocean transportation and by the Department of the Army, which is the single manager for port terminal operations. The control of export traffic is exercised by the Military Traffic Management Agency in coordination with the Army Terminals.

This type movement has generally been marked by long transit times and required excessive amounts of materiel to be in transport channels to assure adequate and timely support of operational units in the oversea areas. This routine procedure has long been considered inadequate and insufficiently elastic to be responsive to the present day logistics requirements of the Air Force.

In our effort to make our present systems more responsive to our needs, the AMC has promoted a service which we call LOGSEA. This service utilizes the presently existing resources of the Department of Defense. However, it provides a method of expeditious and preferential handling of certain materials urgently needed in oversea areas which, for lack of airlift capability, must be moved by ship.

Under the LOGSEA arrangement, the shipping Transportation Officer, in coordination with our port Logistic Offices, determines the most advantageous vessel-sailing to meet the needs of a specific shipment and oversea due date. He arranges, in coordination with the Army Terminal and MSTS, to book the cargo to a specific vessel. This may be a MSTS-controlled ship or commercial liner service. Systems have been devised to permit direct shipside movement of this cargo, appropriate documentation, marking and advice of shipment in order that expeditious handling can be given at all points enroute to destination.

The system is quite simply the application of intelligent export traffic management principles. It is designed primarily to eliminate port holding times in both the CONUS and Oversea Port area and the backlogging of priority cargo with routine cargo. Information available up to this time indicates that under this service we have reduced our worldwide transport pipeline, CONUS depot to our major ports overseas, from 45 days to 22 days.

Special handling for special cargo is the keynote. We recognize that there can be no substitute for this action when the materiel involved has direct association with our combat capability.

In the field of packaging and materials handling equipment, our management efforts are similarly directed toward every new potential or innovation. In materials handling, the high-speed distribution concept has greatly enhanced our efforts to develop streamlined techniques and equipment compatible with the transport mode.

An outstanding achievement in this area is the vastly improved method by which jet engines are handled when being transported. Lightweight, mobile and less costly transportation trailers, replacing the hermetically sealed metal container, are employed to carry these engines. As a result, substantial savings are realized through the reduction of tare weight, handling and maintenance.

Packaging criteria is kept compatible with the high-speed distribution concept by constant streamlining of both the technical and managerial aspects. New materials and methods are constantly being discovered which add to our proficiency in this area. Headquarters Air Materiel Command, in addition to exploiting these new methods and materials to the fullest extent possible, also remains alert to the fact that management must progress accordingly.

A new packaging program currently under development by Hq, AMC actively reflects this axiom. In essence, this program can be categorized into three different phases—establishment of packaging technicians within each Air Procurement District, use of electronic accounting machine equipment, and a concerted effort to standardize and minimize packaging costs.

An elaboration of this program will show its feasibility and the common sense involved. For example, positioning an Air Force packaging technician in an area where he can have daily personal contact with the contractor will enable him to approve at once the packaging used. This, in turn, will eliminate extended paperwork and correspondence with the depot. It will also afford the packaging technician the opportunity to work in closer coordination with the contractor and assist the contractor in effecting some changes in his operation which will prove beneficial to both the contractor and the Air Force.

The incorporation of electronic accounting machine equipment into our system eliminates mountains of paperwork previously encountered. Packaging data cards will be prepared and utilized through the use of this equipment. These will replace the numerous cards used in the past and will enable us to keep accurate, up-to-date records with a minimum of manual labor. This portion of our project will tie in with AMC's overall EDPE Program.

As for the reduction of packaging costs, we feel extreme emphasis in this area is not amiss. The government spends millions of dollars a year on packaging, and it behooves us to insure these millions are spent wisely. In line with this thinking, Headquarters, AMC, in conjunction with Forest Products Laboratory, has developed a standard method for determining the accuracy of the costs of packaging. With the use of this standard, it is anticipated we will greatly minimize our future expenditures for packaging.

We in the AMC feel confident that our High Speed Distribution System is compatibly geared to the jet age. Our planning is not overlooking the space age we will enter in the next decade or shortly thereafter. High Speed Distribution for a High Speed Air Force or Space Force—it's here and functioning today—it will be even better tomorrow.

LOGLAND inaugurator Col. Herbert C. Chambers sends first less-than-truck-load AMC shipment from Mira Loma, Calif.

NAVY'S NEW ATOMIC DEPTH BOMB ANSWERS THREAT OF ENEMY SUBS

THE NEWS THAT "BETTY" is now an operational weapon completes another chapter in the story of the Navy's great contributions to the defense of our country. And we are proud that the Navy Bureau of Ordnance and the Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland, developers of this significant weapon, called upon the facilities of AMF for the production of "Betty". This is another demonstration of the fact that, when it comes to the tough jobs, AMF has experience you can use.

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Where MTMA Fits In Military Transportation

by **Brigadier General I. Sewell Morris, USA**

Executive Director
Military Traffic Management Agency

AN examination of the supply catalogues of the military departments in the period immediately following World War II would reveal a large number of common items. The duplication of effort involved, with each service going its own procurement way to secure items which were, to all practicable purposes, identical was pointed out in both Hoover Commission reports. Prior approaches centering around cross-servicing agreements, single service procurement, and others had failed to produce the expected economies.

The approach taken by the Department of Defense in eliminating this duplication and functional overlap resulting from individual departmental procurement of common-use items is by now familiar: The Single Managership. This alternate solution of the Department of Defense envisioned the assignment to a single military department of the full responsibility for a common item, virtually from original procurement from the manufacturer to ultimate consumption. Such common items as subsistence, clothing and textiles, petroleum products, and photographic supplies have all been included in single manager assignments of this nature.

A moment's reflection, however, will reveal a further element of commonality not only among these various items of supply, but in the services ancillary to these items. This common service element is, of course, transportation—and transport services also remain substantially the same regardless of the department affiliations of the user. And perhaps the most vital single aspect of transportation utilization is traffic management.

Traffic management within the United States was the first application of the single manager concept to a common service as distinguished from a common commodity. Within a few months after MTMA was established, the same idea was applied to other common transportation services at sea and in the air.

The consolidation of all departmental traffic management functions in a single agency was a tremendously difficult task. The simplicity in the telling about it belies the magnitude of the undertaking. Each military department had a well-organized traffic organization tailored to meet its own particular logistical needs. In fact, one of the major initial problems facing the Military Traffic Management Agency was the Herculean task of devising an organizational structure, and an operating base, which would be completely responsive to these many and often divergent departmental requirements.

Differences of opinion had to be resolved, logistical systems had to be studied and analyzed, and many separate points of view reconciled. But the job was done and done so well that within a few months of activation, the headquarters of the Agency was formally opened in Washington, D.C., and the Passenger Division had begun to route personnel movements.

The headquarters is formed on a directorate basis, which is even now under detailed study to determine where and how further organizational and procedural improvements can be made. The manner in which the directorates were staffed also illustrates clearly the inter-service nature of the Agency. MTMA drew its personnel, both military and civilian, from all the military departments, asking only that the individuals furnished be the most qualified persons available. No job is specifically earmarked for a particular department because the Agency, quite properly, may fly the flags of all the services. The magnificent job that was done in forming the Agency is ample proof of the quality of the professional traffic management personnel the military services gave MTMA.

The Executive Director of the Agency is an Army general officer and plans call for continuance of that office as an Army billet. The organization, although housed in the Department of the Army for housekeeping, is by no means all Army. The heads of the three directorates reflect the full array of departmental uniforms: An Army and an Air Force colonel and a Navy captain. The principal assistant to the Executive Director—the Executive Officer—is a career civilian of many years service in transportation and traffic, while the heads of divisions and branches below the directorate level are staffed with civilian and uniformed personnel without regard to their departmental affiliations either past or present.

The civilian personnel are now incorporated into the MTMA civilian personnel complement and have lost their identity with their former military departments. The military personnel, of course, wear the uniform of their service, but the objectivity of viewpoint that has been exhibited in-

dicates that all are striving to achieve the professional objectives of efficient and effective traffic management for the entire defense establishment.

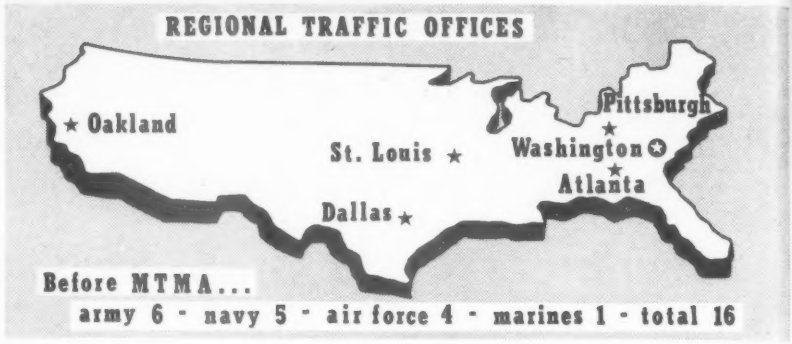
This inter-service characteristic is even more evident at the regional level.

Prior to MTMA, the military departments were operating a total of sixteen field traffic management offices. The Army alone had six transportation zone offices; the Navy had five Central Freight Control Offices; the Marine Corps had a Freight Control Office; and the Air Force had four District Traffic Offices. In consolidating these identical traffic management functions in MTMA, the number of field offices was more than halved. Five regional offices were established with three area branch offices; experience acquired during the first year of operation, however, resulted in the closing of two of the branch offices.

The Regional Directors who head the five Regional Traffic Offices scattered throughout the nation are drawn from all the departments just as are their employees. The Eastern Traffic Region in Pittsburgh, Pennsylvania, is headed by an Army colonel; the Central Traffic Region in St. Louis, Missouri is also headed by an Army colonel; the Southeastern Traffic Region, located at the Atlanta General Depot, was originally headed by an Army colonel, but an Air Force colonel is now in command; the Western Traffic Region at Oakland, California is headed by a Navy captain; and the Southwestern Traffic Region at Dallas, Texas is under the leadership of an Air Force colonel.

On 1 April 1957, the field organization of MTMA was formally activated. At the time, however, many detailed problems had not yet been resolved, thereby delaying assumption of all field traffic management functions. As personnel and facilities became available, various functions were assumed by the regional offices on a phased-in basis. In this fashion, the transition from the departmental structure to the MTMA organization was made smoothly and with a minimum of disturbance of existing functions. By 1 July 1957—within a year of formal activation of the Agency—and on schedule, MTMA became fully operational both at the Washington headquarters and at the regional offices.

The management of military traffic was but one phase of the total mission assigned to the Agency. At the time the MTMA organization was developed, the planning for the use of transportation resources in the event of a national emergency was lodged in an organization known as the Joint Land Transportation Agency. On 1 October 1956, this organization was taken over by MTMA in its entirety—personnel, records, planning data, and functional responsibilities.



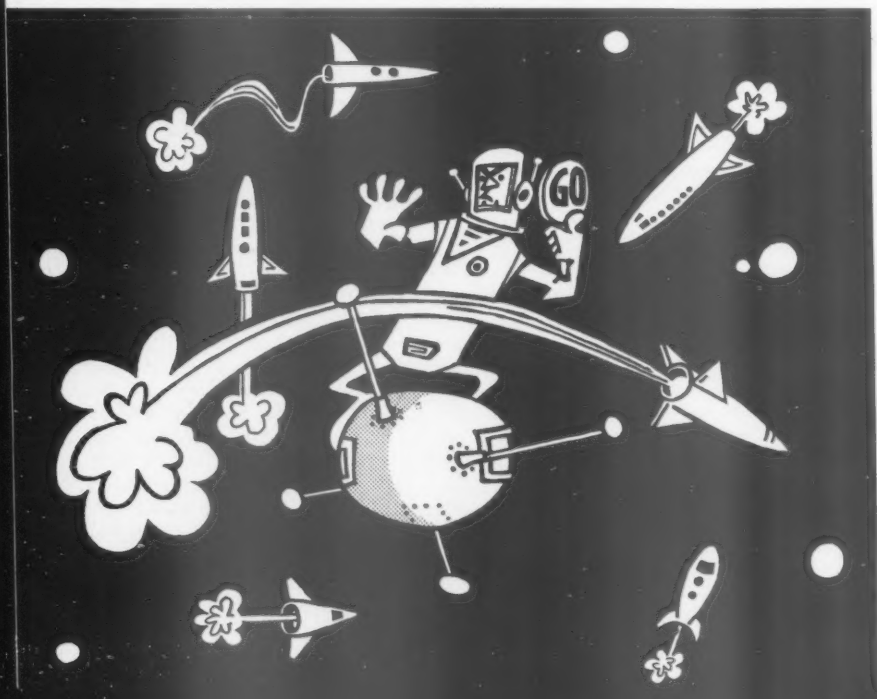
MTMA was also faced with the editorial and coordinating task of preparing and writing the Military Traffic Management Regulations which are applicable throughout the Defense establishment. Although the individual military departments still retain the authority to specify what, when, and where both freight and personnel will be moved, MTMA is charged with determining the "how" of such movements. In ensuring an economical, fully coordinated operation, the MTMR, issued in March 1958, provide a single source of traffic management policy advice and guidance to local shipping installations.

Certain specialized professional activities, which can best be handled on a centralized basis, have been assigned to the Agency headquarters or to an individual regional office. Field operations concerning traffic management functions in the shipment of petroleum and bulk liquids, and the management of the service-owned interchange fleet, are performed at the Central Traffic Region. Much of the data-collecting activity connected with the Loss and Damage Prevention Program of the armed forces is centered also at St. Louis with staff supervision retained in Washington.

Highly technical functions have been retained specifically at the Agency headquarters. All negotiations involving rates and classification matters are handled by the professional experts at the Agency headquarters, while other functions, such as the compilation and interpretation of traffic management statistical data, are also centralized in Washington.

In all the many areas included in the general field of traffic management, MTMA is working to accomplish its assigned mission of providing efficient, effective, and economical traffic management services to all agencies of the Department of Defense in securing the most for each transportation tax dollar.

"And perhaps the most vital single aspect of Transportation Utilization is Traffic Management."



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New Navy Computer Rivals Science Fiction

Office of Naval Research has announced **Perceptron,** a computer which can see, learn and teach itself. A year away from completion, the machine is said to be one step from a computer capable of translating foreign languages.

Navy says the new concept embodied in **Perceptron** opens "challanging possibilities" in such fields as automatic landing systems, automatic pilots, and recognition systems. Tests on the computer are currently being run on conventional equipment, and on such trials as right and left perception, it has scored up to 97%.

With electronic "eyes" similar to ordinary TV cameras, it is possible for the computer to read both print and script, and the device has responded to spoken commands. By expanding on the results so far attained, the Navy says the machine could distinguish between man, woman and various animals.

Although Navy does not expect applications of the system in the "immediate future," they feel that with decreases in cost and size and greater refinements, the computer will open an entirely new field in engineering, aimed at development of "intelligent systems."

Air Force Constructs Two Missile Test Sites

Air Force has received Army go-ahead to begin work on its first **Titan ICBM launch pad,** to be built at the new **Pacific Missile Test Range.** At the same time, the AF Rocket Engine Test Facility at Edwards AFB, Calif. is reaching its final stages of construction.

Other launching pads for such missiles as the Atlas ICBM and the Thor IRBM will be built at the west coast missile range. The $400,000 facility at Edwards will be used by **North American Aviation** personnel in connection with the **X-15 program.** The test site will then be turned over to National Advisory Committee for Aeronautics, the Edwards Power Plant Branch and the Navy.

First flights of the X-15 will be made with two XLR-II rocket engines until more powerful powerplants are available. At Edwards, the X-15 will undergo tie-down tests.

ARPA Gets Directive On Solid Fuel Work

Defense Department has directed the **Advanced Research Projects Agency** to develop new high-performance solid propellants, and to carry on supporting studies to permit use of the solid fuels when they are available. The order confines the program

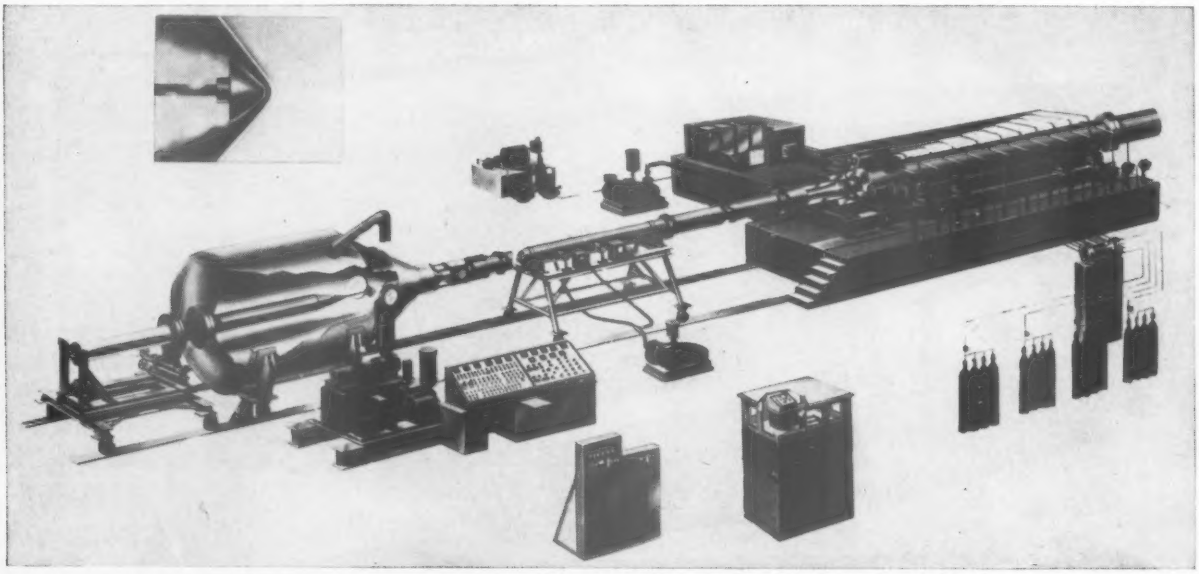
Space Lab Gear Disclosed by GE

Space laboratory equipment which will be used on such projects as the re-entry problem for Thor and Atlas ballistic missile nose cones has been revealed by the **General Electric Co.,** at its Missile and Ordnance Systems Dept., Philadelphia, Pa.

To be operated by GE's Aerosciences laboratory, the equipment includes the largest plasma jet generator in the country, a 120-ft. shock tunnel, a solar furnace and electronic mass-accelerators.

Just completing its development stage, the plasma generator will yield temperatures more than twice the surface temperature of the sun. The device will be used in approximating space-flight conditions. The six-inch by 120-ft. shock tube will be used in aerothermodynamics studies.

The solar furnace will be used to supply GE scientists with low-temperature heat cleanly and cheaply, and the electronic mass accelerators will be used in free-flight tests, hurling a mass at velocities over twice as great of those produced by an 16-inch cannon.



The complete space technology shock tunnel operation at General Electric's Missile and Ordnance Systems Department is shown in this simplified artist's drawing.

Shown are the major components of the facility: the driver tube (right) which is filled with an explosive mixture of gases (insert); the highly instrumented driver tube portion down which hot, high speed air is propelled; the reservoir (left) preceded by an expansion nozzle. Fuels, consoles, Schlieren system, and many other instruments help round out the picture.

to research, eliminating end items as a goal.

Signed by **Deputy Defense Secretary Donald Quarles,** the directive calls for missile fuels which have specific impulses from 10-20% higher than existing solid propellants. Subsidiary to the work with hotter fuels, ARPA will conduct research on cooling, insulation and heat resistant materials.

New Army Missiles Are Under Study

Army has three short-range missile projects in the study stage, two of which have resulted in study contracts. At one time, there were more than 150 bidders on two of the programs.

The projects are: (1) Missile A—study contracts have gone to four companies. The weapon would have roughly an 8-mile range, and would replace the Little John. (2) Missile B—not off the ground. A British missile reportedly can handle Missile B's undisclosed mission. (3) Mauler—study contracts reportedly awarded. Mauler would replace or supplement present 40 mm antiaircraft guns.

B-70 Christened By Air Force

The B-70, Air Force's 2000 mph heavy bomber scheduled to replace the B-52, has been christened **Valkyrie.** The name comes from Norse mythology, in which the Valkyries were airborne maidens capable of deciding outcomes of battles.

To be built by **North American Aviation,** the bomber will cruise at 70,000 ft. The name was suggested by **T/Sgt. Francis W. Seiler** in a contest conducted in the **Strategic Air Command.**

Project Manhigh III Announced by ARDC

Air Research and Development Command will launch another manned balloon into the upper atmosphere this summer at Crosby, Minn. To be called Manhigh III, the balloon flight will be a follow-on to last year's 102,000 ft., 32-hour space-equivalent test flown by **Lt. Col. David G. Simons.**

Simons will be project manager of this year's flight. Describing the test, he said: "From the second Manhigh flight, we learned what we have to study. Now, we are going to study the problems themselves."

An air-ground telemetry system will monitor the reactions of the balloon capsule's occupant during the flight.

Rundown on the Stever Report

Faulty organization, inadequate funding, weak personnel policies and delegation of responsibility with no authority in the face of soaring technical demands on the Air Research and Development Command have resulted in recommendations that Air Force drastically overhaul its policies and operations.

The above conclusions and sweeping recommendations for improvement are the fruit of an AF Scientific Advisory Board study under Dr. H. Guyford Stever, associate dean of engineering at Massachusetts Institute of Technology. The study was ordered by AF Chief of Staff Gen. Thomas D. White shortly after the first Soviet Sputnik was launched last October.

Congress, Bureau of the Budget, the Executive Office of the President and the Defense Department also came under fire, particularly in connection with inadequate funding and "meddlesome" policies in delegation of powers and authority.

The primary suggestion offered by the group was aimed at ARDC organization. Present geographical lines, they said, should give way to a functional line of command. The committee recommended that each of the "distinct functional areas" be under a Deputy Commander, responsible for overall program guidance and direction. One objective of this move would be to cut costs and confusion resulting from staff work duplications.

Maximum authority would be given to the Deputy Commanders, avoiding one of the most heavily stressed faults noted in the report: the practice of placing responsibility and authority at two different levels. Not only does this limit the efficiency of the project, the committee said, but it further creates a severe personnel problem. The Project Officer is hamstrung, therefore unable to show his full abilities. In many cases he is driven from the services to a more flexible situation in industry.

Existing confusion in the ARDC research program, said the report, would be lessened by a Deputy Commander for Research, directing ARDC's entire exploratory research program. Under the present set-up, research is often interwoven in technical development or weapons system programs, usually to the detriment of research.

Another Deputy Commander would have full sway for technical development projects under the report. Aim would be to limit four deficiencies in the present system: (1) AF frequently fails to get full state-of-the-art developments in time to benefit from them; (2) program costs in this area are often unnecessarily high; (3) the incentive for this type of work is not up to par; and (4) the basic competence of AF R&D declines.

Although the committee voiced theoretical approval of the Weapon Systems concept, it felt that practical controls were needed to take advantage of the concept. To make this possible, the committee recommended an ARDC Vice Commander be placed in charge of all aerodynamic and ballistic weapon systems, with a deputy under him in each of these areas. The committee acknowledged that both Advanced Research Projects Agency and the National Aeronautics and Space Agency would work in these fields, but assumed that the AF would continue to do much of its own work.

The Stever group expressed full approval of the recent appointment of a Deputy Commander for Air Defense Systems Management, but urged that the newly-appointed officer be given "complete authority." Also created by the group would be a Deputy Commander for testing, responsible for all AF evaluation testing.

Some of the sharpest criticism in the report was directed at past and present R&D funding policies—both in the Air Force and other parts of the government. Tracing the R&D financing from 1946 to the present, the committee said that the only time when R&D dollars even approached the necessary level was at a time roughly corresponding to the Korean conflict, only about three years. And even then, the committee said, industry research and development contracts fell off by roughly $125 million. This, added to current inflation and larger overhead costs, has reduced the R&D budget to its present "inadequate" level.

As to internal management of funds, it was suggested that the ARDC be given procurement authority for its own needs. Presently, purchases must be made with Air Materiel Command approval. The group also urged funding flexibility within ARDC, subject to a frame of "stability and continuity."

Although personnel policies are receiving more attention than in the past, the Stever Committee expressed a desire for further improvements. The report states that the present rate of loss in technical officers is excessively high, and that the R&D effort is undermanned. On the operating level, the committee called the present tour of duty inadequate, and suggested extension to five years. This would give R&D officers a chance to become familiar with their jobs, and then give

them an opportunity to use their knowledge before being transferred.

The committee said that the relative importance of the pilot is on the wane, and that the most pressing need is for technically skilled personnel. The Report calls for an improved training program, and suggests that ARDC make more effective use of civilian skills on tap.

Besides Stever, the committee was composed of Bennett Archambault, president of Stewart-Warner Corp.; Dr. W. Randolph Lovelace, president of Lovelace Foundation and Medical Clinic; Dr. Clifford T. Morgan, a private psychologist; Prof. Courtland D. Perkins, Princeton University, one-time chief AF scientist.

Also, Perry W. Pratt, vice president and chief scientist at United Aircraft Corp.; Ralph A. Sawyer, University of Michigan; T. F. Walkowicz of the Rockefeller Foundation; and Raymond J. Woodrow, Princeton University business manager.

Dyna-Soar Plans Released by AF

An industry team from **Boeing Airplane Co.**, and one from the **Martin Co. and Bell Aircraft Corp.** will serve as development sources for the Air Force **Dyna-Soar** boost/glide aircraft project. Each of the teams will head a group of five or six companies.

The Martin-Bell team will serve essentially as a competitive back-up for Boeing. Aim of the Air Force-encouraged Martin-Bell marriage is to supplement Martin's management talent with the propulsion experience gained by Bell in the X-1 manned rocket project.

The principle behind the boost/glide aircraft is to power the plane into a near-orbit, and then allow it to coast back to the earth's surface. Basic research has been handled by the Air Force and National Advisory Committee for Aeronautics.

Man Needed in Space, Says ARPA Official

It is unlikely that space will be conquered through automation, according to **RAdm. John E. Clark**, Deputy Director of the Advanced Research Projects Agency. Clark also said that his fellow scientists are "more and more" agreeing with this point of view.

Clark told a recent meeting of the **American Rocket Society** he did not believe "that space will be ours until we are able to maneuver in it . . . to change our course and to increase or decrease our speed at will." To carry out this type of operation, he said a "clever combination of fully automatic equipment and the reasoning power of man" seemed the most likely answer.

The ARPA official also said that a light-weight, small-thrust engine which could draw energy from surrounding space, such as ion rockets, and improved systems for navigation would be needed to master space.

Reliance on Aircraft Predicted by Irvine

Manned aircraft will continue to be the mainstay of the Air Force's deterrent power for the next 15-20 years, according to **Lt. Gen. C. S. Irvine**, Air Force Deputy Chief of Staff for Materiel. The reason for this, he said, is the need for maximum versatility not possible in an all-missile force.

Irvine told a Detroit industry missile and space conference that while current Air Force strength is 99 to 1 in favor of aicraft, in the future this will gradually shift until the ratio is 60/40 in favor of piloted craft. He predicted that this ratio would prevail into the indefinite future.

The Deputy Chief of Staff called on industry to provide better propulsion systems for existing types of aircraft through improved design, new fuels, free radicals and new principles. This is made necessary, he said, by the lack of any new anti-gravitational devices or systems.

ARPA Okays Two Programs

An Air Force nuclear propulsion study, and Army construction of a space vehicle communication antenna have been authorized by Advanced Research Projects Agency.

Under the Air Force study, a feasability contract will be let to **General Atomic Div. of General Dynamics Corp.** Aim of the research will be development of propulsion using controlled nuclear explosions as power.

For the Army, ARPA okayed an 85-ft. space communication antenna to be built at Camp Irwin, Calif. by California Institute of Technology's Jet Propulsion Laboratory. To have 2500-mile range, the antenna is scheduled for completion by the end of the year.

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This month: Rear Admiral John H. Sides

Director
Weapon Systems Evaluation Group

ON January 1, 1956, a small, blue flag with two white stars ran up over Navy's Cruiser Division Six, a brand-new and unique sea-going command. Cruiser Division Six, first guided missile division to go to sea, had opened a new phase in naval warfare. The flag belonged to Rear Admiral John H. Sides, the first Navy flag officer to take command of a sea-going guided missile command.

For many men, this would have been the culmination of a successful military career, but for Sides it was only a mid-point. The ninth-ranking midshipman in the 448-man Annapolis class of 1925 has earned his nickname: Vice Admiral John H. "Savvy" Sides is now Director of the Defense Department Weapons System Evaluation Group.

Admiral Sides now keeps office in the Joint Chiefs' section of the Pentagon. Soft spoken, admired by those working with him, the Admiral has a reputation with Pentagon newsmen for knowing the answers, and, in many cases, the questions—before they are asked.

There are probably few men as well prepared for the task of running WSEG as Adm. Sides. The job is enormous: to evaluate weapons systems in all stages of development, either at the request of the Joint Chiefs, the Assistant Secretary of Defense for Research and engineering, or on WSEG's own initiative. At present, WSEG has under study no less than 20 projects, and is preparing to step up the volume.

Except for occasional sea-duty, to use his own words, "Throughout my life, I have been associated with Weapons Systems."

Sides did his first official missile work, as Deputy to the Assistant Chief of Naval Operations for Guided Missiles. From then on, missiles were the Admiral's home ground.

In 1951, Sides became Head of the Technical Section in Defense Department's Office of the Director of Guided Missiles. Going back to the Navy in February, 1952, he became Director of the Guided Missile Office of the Chief of Naval Operations, directing Navy's guided missile program for nearly four years.

The results of this experience are top qualifications for his present work. Says Sides: "I have associated with every OSD guided missile director that's ever been, from Keller to Holaday." Another, and perhaps more important item is that Vice Admiral Sides took over his new post with a broad, nonpartisan outlook as to his duties. "We make a terrific effort to insure that our results are objective."

Originally, the job at WSEG was simply analysis of the weapons system and its supporting equipment. But in the face of increased costs and complexity in weapons systems, the job has become correspondingly more difficult and exacting.

To get a full analysis of the costs and advisability of a given system, Adm. Sides' office checks out support activities that will be required, personnel and training, all logistic backup, industrial plants, and facilities needed for testing and evaluation, if the system is still on paper. This, spread over

20 projects in all stages of development, is an almost overpowering job.

The methods used to do the job are several. Heading the list is operations analysis, with visits to proving grounds and test facilities next in line. The tri-service WSEG, when it can, has a member at all pertinent briefings of all armed forces. It also receives written reports on any system which one service feels will cut across the lines of another. The office also conducts some testing, although it relies on the Services for major support.

WSEG is faced with the constantly changing character of the technological race, changes in its own office, and changes in the demands placed upon it. They constantly fight deadlines, and must stay in step with the many requests from JCS and the Assistant Secretary. In addition, they must keep an eye on many projects not specifically submitted to them.

One means of easing the load is being studied by Adm. Sides and his staff at the present time. This is to carry out the evaluations earlier in the design/development/production cycle. Not only does this make the job easier, but it gives the evaluation additional worth. (It is more profitable to evaluate a project in time to influence planning than to wait until it is on the production line and treat it in retrospect.)

WSEG is still in the building stage. Presently employing 85 civilian technicians on his staff, Adm. Sides expects to have 100 in the near future. This technical staff support is supplied by the Institute for Defense Analysis. In addition, he has a two-star officer from each service, 30 other military personnel, and a secretarial force of approximately 60 working with him. He also feels his office will have increased influence on top-level Pentagon decisions, the amount of money spent arming the nation, and how efficiently each dollar is used.

There are other factors bearing on its future. Says Sides: "Many people ask whether this office will be affected by the reorganization here at the Pentagon. I feel that the importance of this office will increase." With the recent furor about interservice rivalry in the weapons system area, the WSEG takes on a new significance: "We work primarily with those problems not confined to one service."

In respect to the other scientific offices in the Defense Department, WSEG has no formal ties. Their top priority work comes from JCS and Dr. Paul Foote's Research and Engineering Office. They have no official connection with such bodies as Advanced Research Projects Agency or William Holaday's Guided Missile office, although a necessarily close liaison is maintained.

The work at the Weapons System Evaluation Group is unique and exacting, but under the guidance of Vice Admiral John H. "Savvy" Sides, it is certain that the job will be accomplished, both in the best interest of the nation, and with no favoritism to any one service. Adm. Sides is too busy for politics.

What the Air Force is Doing About Air Safety

by Bill Borklund

IRRESPONSIBLE joy riders, careless, non-professional, legalized murderers: these vitriolic charges were hurled, in the wake of two spectacular mid-air collisions this year, at a group of pilots who, in 1957, logged 12 million hours in the air—compared to 13 million for all the rest of the nation's air space users.

Strongest, and virtually the only public defense of the group was given by Air Force Secretary James H. Douglas. Objecting to "a tendency to treat Air Force planes as aggressors in reports of near-miss incidents in the air," he said:

"Until there is positive control in the separation of air traffic, we undoubtedly will continue to have near-miss reports. It should be emphasized that it takes two aircraft to constitute a near-miss and because an Air Force aircraft is involved it does not necessarily follow that it is responsible."

There is a natural tendency to try to fix the blame for accidents before all the facts are in. On top of this, the Air Force has not engaged in any extreme disciplinary measures, an action (or lack of it) interpreted by the general public as a kind of fatalistic indifference toward these events. (Truth is, head-rolling hasn't been warranted.)

This apparently unnatural quiet has lent weight to the words of the critics. What the critics don't realize probably is that they were spared a scorching counter-attack by an Air Force policy order to its commanders, senior officers and information service people which read, in part:

"The primary requirement is to attain public understanding of this problem. . . No action will be initiated which could inadvertently invite criticism of other governmental or civilian agencies . . . It should be emphasized that all are working together to prevent air accidents now and in the future."

Far from being indifferent, the AF has an impressive record in the air safety field (see box). With such a record, why has the Air Force been focal point for all the attacks? The answer is not hard to find. It revolves around a vaguely understood problem, hysteria, and pressure from agencies not fully informed or busy grinding personal axes.

The Problem

The whole air traffic control problem is extremely complicated. An Air Force officer spent nearly an hour recently explaining to a congressional committee (holding hearings on the proposed new Federal Aviation Agency) just what the problem amounted to before he could even begin to outline AF proposals for a solution—and this to a committee which was at least conversant with air traffic problems.

Consequently, it's not hard to understand how the average citizen, who spends only two minutes reading the headline story of his paper, will come to some wrong conclusions if exposed to loosely-written news.

So, Air Force has found itself set up rather abruptly, in the nation's newspapers, as a scapegoat for the nation's air traffic ailments—something tantamount to saying it's General Motor's fault there are so many deaths on the country's crowded highways.

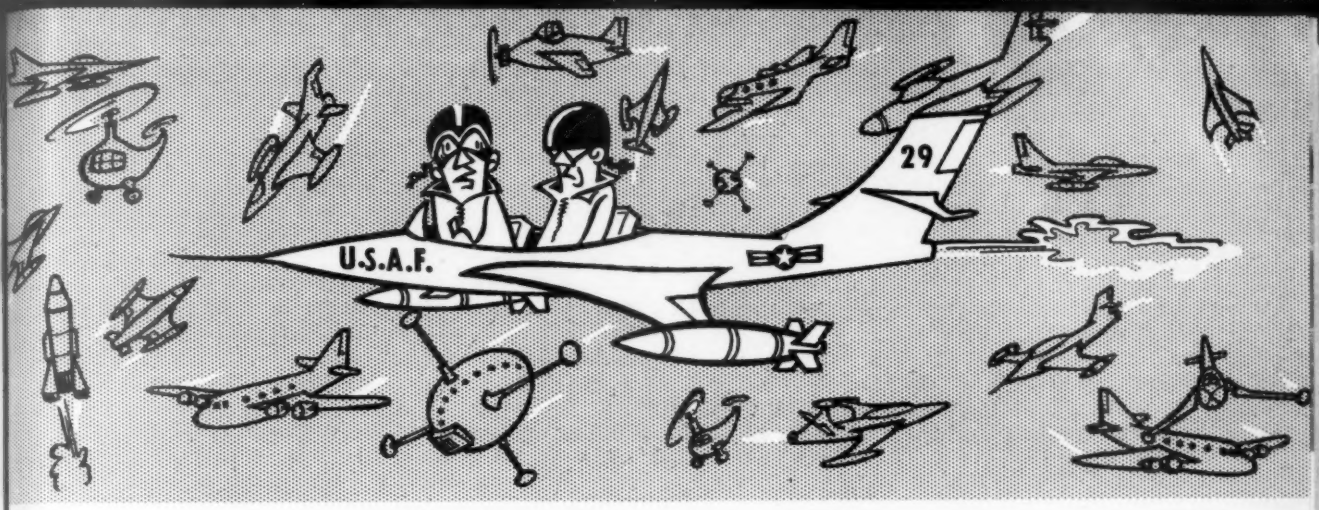
The fact is, no single group can justifiably be placed at fault for the recent rash of mid-air collisions. (As a matter of fact, it has been established that in every collision from the most recent clear back to the disaster involving two commercial airlines over Grand Canyon last year no pilot involved "ran a red light," i.e. in no case did they violate existing flying rules.) Rather it is a situation which is the problem: to whit, the amount of air traffic has mushroomed far beyound the capability of existing controls to handle it.

Civil Aeronautics Administration chief James T. Pyle has estimated there are about 200,000 operations daily vying for U.S. air space. On the other hand, CAA has facilities and people enough to control a maximum of only 17,000. In addition, they are trying to control 600-knot-an-hour aircraft with techniques developed in a 160-knot era. The amazing thing is not that these collisions happen at all, but rather that they don't happen more often.

The problem is not going to become any simpler. It is estimated that in a few short years eight out of every ten people who travel more than 700 miles will go by air.

The answer, of course, is positive control of everything that flies, something the Air Force has long advocated. In other words, all aircraft would fly on IFR and be told by CAA "traffic cops" in ground control facilities where to fly, how high and at what speeds. Under present conditions, planes can fly on one of two different systems—IFR or VFR—and on clear days they are pretty generously mixed. Said one Air Force pilot about such an arrangement on our bumper-to-bumper airlines, "It's getting so bad, I look forward to flying in bad weather when everyone has to be on instruments. Clear days are murder."

The hitch to positive control is that with the presently available ground environment, requiring IFR on all flights would knock air transportation flat on its back. (Bolling Air Force Base, for instance, gave it a try recently, saw over 60% of its operations



"Somehow I don't feel free as a bird."

halted until the experiment was dropped.)

Nor is the proposed new Federal Aviation Agency going to solve the problem. The FAA is only the first step in a five-to-ten year program, but it is not going to represent an overnite cure-all. Its primary value: providing a framework within which the problem can be solved by putting management of the problem in one office. (Chief reason air traffic control has lagged until now is that responsibility is spread all over the Washington, D.C. lot. Example: the CAA, Civil Aeronautics Board, and Commerce all have budgetary authority, must each handle dozens of coordinating procedures more complicated than anything in the Pentagon to reach a decision.)

There are other problems. Among them: the men who run the control towers carry an awesome amount of responsibility, (and the military would like to give them more by putting them in charge of AF control towers. CAA would like to accept but doesn't have the manpower.) In contrast, their pay is low, hours long and career incentives almost non-existent. A real career service plan could solve this problem.

In any event, the crisis is one of air traffic and not Air Force vs. Commercial Airlines. Said Major Vernon R. Stutts, editor of the Air Force Flying Safety magazine, "It is hardly acceptable to suppose that wholesale restrictions and ironclad separation of military and civilian air traffic is a reasonable solution to the problem. To carry out the defense mission of the nation, the military plane must fly, and have access to every cubic inch of sky covering the entire nation. To carry out the transportation demands of the nation, the civilian plane must fly—within these same cubic inches."

For the Record

Is the Air Force careless?

The Civil Aeronautics Board, which makes all the rules by which aircraft fly in the U.S., says the AF "has probably the best safety program in the field."

Non-professional?

The military is even more stringent, in many cases, than civil air regulations. For instance, the AF requires five miles visibility before a pilot can fly under visual flight (see-and-be-seen) control while civil regulations require only three.

Irresponsible?

Here the list begins to look a little endless but, to name just a few:

1—The AF sponsored and placed into effect, over a year ago, a high altitude positive control plan. As accepted by CAB, this means all airplane routings, military and civilian, above 24,000 ft. fly on Instrument Flight Rules (IFR).

2—The AF has transferred $5 million (a conservative estimate) of its own research and development funds to the Airways Modernization Board (as well as offering it 18 officers on three-year assignments) to help the AMB in its program to improve air traffic.

3—The AF has an officer assigned on full-time duty to each Civil Aeronautics Administration regional office to help on air flight control problems.

Nor is the Air Force doing all this as a reaction to this Spring's collisions. Since 1955 the Air Research and Development Command has sponsored studies with private industry to develop anti-collision devices. The AF is still assisting, even though the project was transferred to the AMB in early 1958. For the last year and a half the Air Defense Command, working with CAA, has been developing a system of providing long-range radar information to CAA to help their traffic control operations.

4—AF headquarters has ordered all AF pilots not to fly non-tactical jets on Visual Flight Rules (VFR) below 20,000 ft. except in takeoff and landing. Some field commanders have gone further and eliminated even the exception.

5—Itinerant jet aircraft can not use civil airports, unless assigned there.

6—AF is making available to AMB considerable AF equipment such as VOLSCAN (air traffic control scheduling) and to CAA some B-57 and C-131 aircraft (for high altitude flight checking of CAA facilities).

7—The Air Training Command is painting the nose, tail and wing areas of some 13,000 non-tactical aircraft a blaze orange to increase daylight discernability—part of a program begun in early 1957.

MSTS . . . Navy Plans Ahead For Emergency Sealift

by Vice Admiral John M. Will
Commander, Military Sea Transportation Service

THE Military Sea Transportation Service was established in October 1949 by a charter issued by the Secretary of Defense. This placed under one authority the control, operation and administration of ocean transportation of cargo, personnel and petroleum for the Department of Defense. This involves the movement by sea of, and logistic support for, U. S. Army, Navy and Air Force military forces outside the United States and, when authorized by the Department of Defense, for other Government agencies. Other tasks assigned MSTS are to plan and negotiate for use of commercial shipping as necessary, and to plan for and be capable of expansion in time of war as directed.

It is a formidable assignment, for today our forces are dispersed throughout the world to an extent greater than at any time in our previous history. MSTS exists because sea transportation is an extremely vital part of America's defense. Top military planners long ago decided that proper use of ocean supply is vital to the ultimate success of any military mission overseas.

The shoreside establishment of MSTS consists of the headquarters of the Commander MSTS in Washington, D.C.; four area headquarters at London, New York, San Francisco, and Yokosuka, Japan; three sub-area staffs at New Orleans, Seattle, and Leghorn, Italy; and some thirty other offices in various ports of the world.

To carry out its assignments, MSTS maintains a nucleus fleet and depends upon the private shipping industry to provide the flexibility demanded by expansion or contraction of shipping requirements.

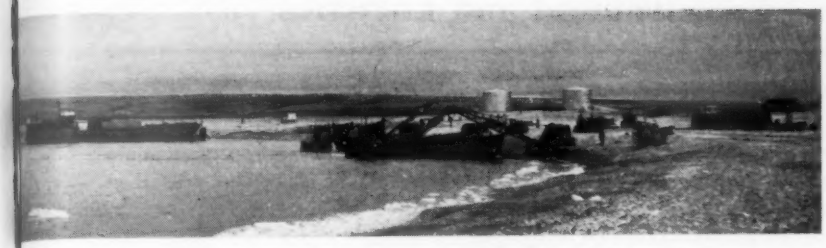
The nucleus fleet consists of government-owned ships, designated as USNS and classed as "in commission" or "in service," and USS commissioned ships of the Navy, assigned to MSTS. This fleet is made up of transports, cargo vessels, aircraft carriers and tankers, but is maintained at the bare minimum essential for the implementation of the MSTS mission. The purposes for which the ships are used vary. More than half are fairly small craft, including strictly Navy amphibious and special purpose ships, of which few, if any, have counterparts in commercial shipping operations. Many of them operate intra-area in the Far East, while others serve in the Arctic and other remote areas far removed from the customary trade routes. The transports provide accommodations for military dependents, and for mass troop movements for which the commercial passenger lines do not have the facilities.

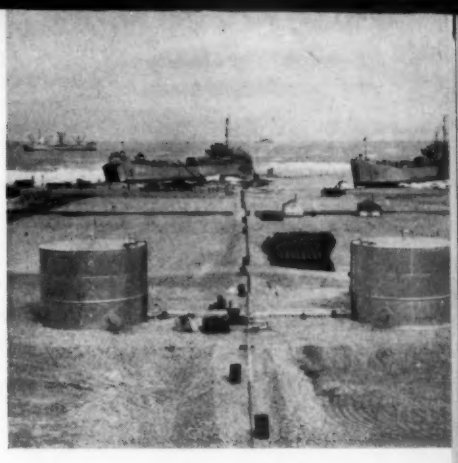
The complex seaborne logistic support of Department of Defense agencies requires this nucleus fleet of versatile and special purpose ships. However, in its normal operations it is only with the help of the commercial shipping industry that MSTS can meet its commitments. Privately-owned ships of the U. S. Merchant Marine, in regular berth line services, or under time or voyage charter, lift over 70% of the military cargo. MSTS is ever mindful that it is the American Merchant Marine which provides the security of an expansive orbit around MSTS' small nucleus fleet. For this reason MSTS strives to bolster the strength of American maritime might. Some 75% of MSTS' operating funds are paid in direct support of the U.S. maritime industry.

The operations of MSTS are financed under the Navy Industrial Fund as distinguished from direct appropriations. Its books are kept on an accrual basis, similar to the method followed in private industry. Financing under the Industrial Fund permits greater flexibility than is possible under fixed annual appropriations. This flexibility is necessary to enable MSTS to respond quickly to the fluctuating demands of the military services, permitting as it does the activation and inactivation of ships, the acquisition of commercial tonnage and the increase or decrease of personnel, as required, without the limitations that fixed annual appropriations impose.

On the basis of ocean shipping

Roll-on/roll-off vehicle loading capability is built into the USNS Comet. With 703 vehicle capacity, the MSTS ship is the first ocean-going vessel which can load this way.





Arctic operations are standard with MSTS. LSTs are used for landing operations, transferring vital supplies to Army cargo specialists for inland transportation.

requirements projected by the shipper services (Army, Navy and Air Force) for a coming fiscal year, MSTS determines by what type of shipping it is proposed to move these requirements and prepares an operating force plan, which determines the percentage of cargo, passengers and POL to be moved by controlled or commercial shipping and the number and types of controlled ships to be operated. This plan then forms the basis for estimating costs, and after these estimates have been thoroughly reviewed a budget is prepared. On the basis of this budget, the MSTS tariff rates are determined to be applied to the different categories of cargo and passengers. These tariff rates are so calculated that, provided the requirements prove reasonably accurate, MSTS should break even at the end of the year—no profit—no loss.

Although MSTS conducts its operations to a great extent along commercial lines, it does not enjoy the same freedom of action that industry enjoys. For the acquisition of ships under charter, or for drydocking and ship repairs, MSTS must observe the Government's procurement regulations with respect to formal advertising and the obtaining of adequate competition. These procedures frequently involve a considerable loss of time. Where a private ship operator may place his ship repairs in the hands of the same yard for a prolonged period, MSTS must invite bids in each individual instance.

Under the Cargo Preference Act (50/50 Law), it is required that not less than 50% of government-owned or financed cargoes of dry cargo and POL be transported on privately-owned U.S.-flag ships.

In June 1950 the first real test of MSTS came with the outbreak of the Korean emergency. It was during this period that the development of relationships between MSTS and the maritime industry was initiated. The shipping industry responded in full measure to the heavy demands for the movement of military material. The result was that with the help of the shipping industry, more than 90% of all United Nation troops, supplies and equipment arrived in Korea through the instrumentality of MSTS. A sound and comprehensive working basis was established between MSTS and the shipping industry along mutually advantageous lines.

In addition to normal peacetime assignments, which are extended rapidly in wartime, MSTS also carries out a variety of unusual special projects demanding flexibility of operation. The most complex of these is the annual MSTS Arctic sealift.

In 1950 MSTS assumed the resupply of existing weather stations and military establishments in Greenland, Labrador, Alaska and the sealing stations on the Pribilof Islands in the Bering Sea. Later, in 1955, MSTS was called upon to sealift equipment and supplies to support construction of the Distant Early Warning or DEW Line, the radar defense barrier spanning the North American continent. Since 1951 MSTS ships have sealifted over 3 million measurement tons of cargo and over 20 million barrels of petroleum to our defense installations in the Arctic. At the outset this was entirely a military operation; however as sea lanes were established by hydrographic survey, beach approaches improved by underwater demolition teams and ice forecasting by reconnaissance flights, Arctic shipping has become a safer operation. Each year MSTS has diligently tried to allocate more and more sealift assignments to commercial carriers. Another project in which MSTS is now engaged is the preparation of three ships which it will operate for the conduct of special surveys by the Hydrographic Office.

The addition of the USNS COMET to the nucleus fleet of the Military Sea Transportation Service in January of this year aroused considerable interest in American shipping circles. The COMET is a roll-on roll-off ship. Designed by George C. Sharp, Inc. and constructed by the Sun Shipbuilding Company, the COMET is the first of her type to have been planned and built for the express purpose of transporting wheeled and tracked vehicles, which may be rolled-on and rolled-off —a timesaving logistic feat. Depending upon their type and the number of each, the ship can lift up to a total of 703 vehicles. She was designed to carry approximately one-sixth of the wheeled and tracked equipment of an armored division.

The relative merits of the roll-on roll-off versus the lift-on lift-off type of ship have for some time been debated at length within the shipping industry. Experimentation in such a field, especially to the extent of constructing prototypes, is so costly as to be generally beyond the financial capability of the average commercial steamship company. The pioneering undertaken by MSTS, therefore, in constructing the prototype COMET, after nearly three years of intensive study by the military services, should prove of great benefit to the shipping industry in general. The experience gained through its operation will definitely establish the advantages which ships of this type have to offer. Conversely, any obvious disadvantages will be revealed. For those in the shipping industry who may be interested, MSTS will be glad to make the operating results of the COMET available.

The COMET has not been in operation for a sufficient time as yet to permit of a full evaluation of her potential. Already the need for some minor changes have been determined, and it is certain that more will develop as experience is gained. In its acquisition of the COMET it is believed that MSTS has made a constructive step forward in military transportation, many of the benefits of which will accrue to the advantage of private shipping enterprise.

Procurement and Logistics

AIR FORCE DECISION TO DROP THE C-132 was heavily influenced by strong opinions in favor of all-jet cargo aircraft. The reasons: much AF logistic work must be with the all-jet Strategic Air Command, and turboprop craft might have trouble keeping up; all-jet operating costs tend to be somewhat less than for turboprop equipment.

MARINE CARGO AIRCRAFT WON'T EXIST until they can get a plane to do the job they want done. Marine Commandant Gen. R. McC. Pate has said today's best military cargo planes can lift is only 62,000 equipped troops at one time. He added that for total movement, sealift was faster going to Korea.

WORD HAS LEAKED ON WHY ARMY airborne troops beat the Marines into the air, literally by hours, when both were sent south during the Nixon-in-Venezuela trouble. Army, with full equipment and supplies, loaded aircraft in minutes while Marines took hours. Reason: each airborne soldier carries his own disposition form (on an Addressograph plate), merely stamps out a carbon which he hands to loading officer as he runs onto plane. Marines, on the other hand, have to type (or write) new form for each man while he stands and waits.

AIR FORCE HAS LAID RESTRAINING HANDS on big businesses trying to grab maintenance and repair contracts from smaller firms who have been doing the job right along. Air Materiel Command feels the larger firms should stick to areas where they have experience, in prime and subcontract production. Same idea was behind Air Force request that Boeing Airplane Co. stay out of interceptor market.

TIGHTER CONTROL OF SUPPLY AND MAINTENANCE is being sought by Air Materiel Command. Latest step in effort involved putting supply and maintenance experts in Weapons System Project Offices to handle maintenance engineering and logistics headaches.

HELICOPTER/AIRCRAFT MISSILE PLATFORMS are being scrutinized by many tacticians. Extensive tests along these lines have been run at Army's Combat Development Experimentation Center. Work has also been done to develop infrared night aids for this type of operation. Proponents say these platforms are musts for future war, but complain that the helicopter industry is lagging in their development.

REPERCUSSIONS IN THE PROCUREMENT AREA are likely to result from the Air Force-sponsored study of AF research and development by the Stever Committee. Specifically, the study calls for "sharper selection of weapon systems for production, with a quick and final elimination of those that are behind the times."

ALONG THIS SAME LINE, fewer, bigger contracts will mean tough bargaining for procurement officers as more companies must compete for the same job. Another result of this could be fewer cost contracts, and more of the fixed price type—something that AF has long wanted anyway.

A SIMILAR MISSILE TO REPLACE THE DART anti-tank weapon is a possibility, although there are Dart funds in the FY 1959 budget. This will be good news to those officers who have had doubts to the Dart's effectiveness all along. Both Army and Marines are reportedly considering weapons built in other countries, with the French Nord SS-11 most recent of the wire-controlled tank killers.

POOL TYPE CONTRACTS similar to Martin/Bell cooperation on the Air Force Dyna-Soar project may become a regular thing. Wedding of specialized skills with no movement of men and machines to a centralized point would be the aim of Air Force planners.

Army Gives Congress Missile Shopping List

The Senate Appropriations Committee recently heard Army's complete rundown of money needs for fiscal 1959 missiles and aircraft. Largest item on the program was $109 million for the **Redstone IRBM,** and the total request for funds added up to $1.6 billion.

Army asked for $503 million to spend on surface-to-air missiles, including **Nike-Hercules, Nike-Zeus and the Hawk.** Also included in the request was $44 million for Sergeant, $36 million for LaCrosse, $35 million for Honest John and a successor for Little John. These are all surface-to-surface missiles.

On the aircraft side, Army requested 260 fixed-wing aircraft and an equal number of rotary wing craft. Helicopters to be purchased would include the **Mojave, the Iroquois and the Sioux.** Fixed-wing planes will be the **Mohawk, the Beaver and the Otter.**

Businessmen Criticize Procurement Policies

The Los Angeles Chamber of Commerce has charged that present DOD procurement policies encroach upon the traditional rights of private enterprise. In question is the policy of giving business to labor surplus areas, which has been in effect for several months.

In an open letter to Congress, Chamber president **George B. Gose** accused Defense Department of "violation of public trust" in favoring contractors who will do the work in labor surplus areas. "It was never intended," he said, "that the WPA philosophy should be applied to federal procurement."

Gose charged that "it is neither fair nor economically sound to penalize any business firm or geographic area because of its success," and expressed doubts as to whether the plan to aid poorer areas would do any good in the first place.

Senators Urged To Buy More B-52Gs, KC-135s

Sen. Henry Jackson (D-Wash.) has urged the **Senate Apropriations Committee** to give the **Air Force** $800 million in additional funds for at least one more wing of wet-wing B-52s and accompanying KC-135 tankers. Jackson's request would carry the 1959 FY funds beyond that authorized by the House.

Jackson told the committee that to buy the additional planes this year would result in a per-unit saving of $164,000. His proposal would more than double the number of B-52Gs now programmed, and add 60 tankers to the budget.

Committee Chairman Dennis Chavez (D-N.M.) expressed himself as in "complete agreement" with Jackson, but that his committee would also have to consider questions of financing and priority.

Jackson also asked the committee to make larger provisions for the Hound Dog air-to-surface missile and questioned adequacy of existing research and development money.

Industry Group Scores Navy Overhaul Policies

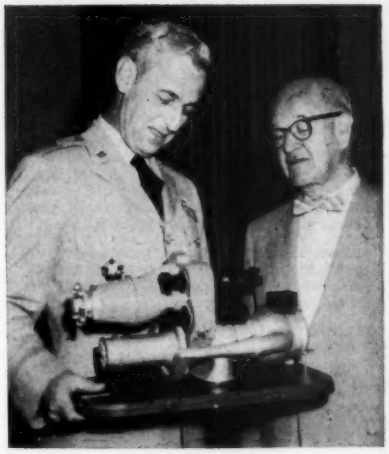
Aircraft Service Assn., spokesman for privately operated and owned aircraft overhaul plants, has gone before Congress in an attempt to force a change in Navy's system of three-year overhaul contracts. ASA maintains that Navy contracted only 3½% of their maintenance funds in 1957, and practically none since then.

ASA director Thomas Wolfe complained that under the current system, no new firms will get Navy contracts during fiscal 1959. This, he said, is the result of all Navy contracts allowing for two yearly renewal options after initial award. The industry association claims that many of its member companies are in trouble from lack of business.

Mobilization Register Open to Public

An unclassified edition of the annual **Register of Planned Mobilization Producers** has been released to the public for the first time. Listed are 18,000 plants which plan with the services for war emergency production.

The plants are cross-referenced to their military representative, who coordinates plant planning. The Register may be purchased for $1.00 from Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C.



Half-scale model of Army's new 250-hp propjet engine, to be used with observation and utility aircraft. Under development by Allison Div., General Motors Corp., the engine will measure 39 in. in length, and weigh 106 lbs.

Materials Needs Basic, Says ARDC Deputy

New materials with significantly improved properties are a basic requirement in Air Force's race to space, according to **Maj. Gen. Marvin Demler,** deputy commander for R&D at Air Research and Development Command.

Citing present problems in this area, Demler told an ARDC-sponsored materials technical symposium that as aircraft and missiles go higher, faster and farther, the problem becomes immeasurably increased because of bulk and weight requirements.

AF Opens High Speed Communications Center

The second of five domestic high-speed **electronic communications centers,** linking Air Force's world wide

Navy's Seacopter, the first hull-type amphibious helicopter, completes a low speed water landing. A modified Vertol HUP-2, can operate from either water or land.

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network has gone into partial operation at **McClellan AFB, Calif.** To be completed this year, the unit was designed, installed and leased by **Western Union.**

The system will be manned by 480 operators and will handle an annual rate of 2½ billion words. Post-World War II systems required 1,300 operators to manage a third of this load.

First of the system's units was installed at Andrews AFB, Md., and following units will be installed at Wright-Patterson AFB, Ohio, Carswell AFB, N.M. and Robins AFB, Ga. Five overseas locations are scheduled for the units next year.

Army Tightens Real Estate Policy

Future Army real estate acquisitions must be preceded by two independent appraisals of the property in question, according to a recently announced Army policy. In the past, only one appraisal was necessary.

The policy specifies that whenever possible, a local appraiser will be used for one of the property estimates. The higher of the two appraisals will be offered to the landowner if both are reasonable. Although an analysis of Army appraising techniques showed them to be sound, the new policy is aimed at reducing complaints of low valuations of property.

Small Firms Attack Weapon Systems Idea

The San Fernando Valley Small Plants Assn. has leveled sharp criticism at the weapons system concept in recent hearings before a Congressional Small Business Subcommittee. The group of small manufacturers claim that they are being squeezed out of defense business.

The industry group charged that too much latitude has been given to weapons system managers, and that smaller firms are completely at the mercy of the prime contractor. The group also claimed that their shops are presently operating at about 35% of production levels two years ago.

Costs Force More Cuts In Navy Aircraft Buys

Navy has cancelled an additional 265 aircraft from its 1958 and 59 buying programs. Reasons for the program slash were laid to material and labor costs by **RAdm. Robert E. Dixon, Bu-Aer chief.**

In an appeal before the Senate Appropriations Committee, Dixon warned Congressmen that more cuts were on the way unless funds trimmed from Navy's budget by the House were restored. As a result of present funding, Navy's 1958 procurement schedule has dropped from 1,220 planes to 696; for 1959, the cut is from 707 to 644. Dixon asked the Committee for restoration of $149.5 million cut by the House.

AMC Using "Two-Phase" Procurement Technique

A "two-phase" procurement technique designed to permit greater use of formal advertising procedures has been **adopted** for use in carefully selected cases by the **Air Materiel Command.** Adoption of the new method followed tests run at AMC after Congress criticized AF buying methods.

Technique will be used where specifications can't be written clearly enough to permit use of formal advertising. First step is for competing companies to submit unpriced technical proposals to determine acceptability of the products they offer. Then invitations to bid are sent to those firms whose proposals are acceptable.

AMC made a "Buy of the Month" award to two men in its Aeronautical Equipment Division in May for "their outstanding work in procuring an airborne camera system for the Army and Navy" using the technique. (Under interdepartmental purchase agreements the Air Force buys aeronautical equipment for all three services.) AMC says their action not only saved these services over 13% of the original cost of the systems, but also purchase was completed in a much shorter time.

AMC Group to Phase In Electronic Support Gear

Air Material Command has formed an **Electronic Support Systems Division** to supervise management and integration of electronic systems into Air Force inventory. ESPPO will be on an operational level, under **Lt. Col. O. C. Mauldin.**

The new division will not have procurement duties, but will monitor compatability and work with production, supply and maintenance problems arising with new electronics systems. Purchase authority will be through **Rome Air Force Depot, N.Y.**

The division will be organized in two branches, covering Air Defense Systems and Electronic Support Systems. In the two branches of ESPPO are a total of nine offices, to be staffed by specialists in production, procurement, maintenance and supply.

How the Project Manager System Works at the Naval Ordnance Lab

In the past four years the Naval Ordnance Laboratory—just outside Washington, D.C., has faced up to a basic management problem. Their solution, a new twist to an old idea, points the way to better military research and development.

by Dr. David S. Muzzey, Jr.
Associate Technical Director for Engineering
U.S. Naval Ordnance Laboratory
Silver Spring, Md.

NOL's Aeroballistics facility handles much of Navy's R&D testing. Shown here are the wind tunnel, with white dome; a 1½-million gallon tank for underwater testing, at top center; and in left foreground, ballistics ranges.

WHAT'S the most effective way to organize and operate a $50-million, 3000-man establishment for military research and development?

This was the familiar problem that faced the directors of the Naval Ordnance Laboratory, Silver Spring, Md., in 1954. There was insistent, pressing need for a solution of the problem. The armed services' skyrocketing requirements for newer and better weapons were demanding a Laboratory output that couldn't be attained with the existing type of Lab organization and operation.

NOL's mission (it has two parts: basic and applied research in physics, chemistry, aeroballistics and mathematics; and the development and evaluation of underwater, surface and air weapons, both conventional and nuclear) was so vital in the accelerated military science war that positive and effective management improvement was required. In a sentence, NOL needed a "plan of organization and operation that would bring to bear upon each R&D project all the technical talent and facilities of the entire Laboratory, and thus accomplish each project more effectively, efficiently, economically and quickly."

Early in World War II the Laboratory had been transformed almost overnight from a small group of about 100 scientists and engineers into a large and complex organization of more than 2000 people. The form of organization adopted at that time might be described as the "line project system." When a new R&D project was received by the Laboratory, the top management assigned it to some NOL line element (a department or division or section), and then this line element assembled—by add-

ing people from other elements and by hiring new people—its own group of scientists, engineers and technicians to carry out this project.

This "line project system" had persisted until 1954, and much good work was accomplished under it. But the inherent disadvantages of the system set up definite limitations on the effectiveness and efficiency of the Laboratory. The basic disadvantage was that it made NOL simply an aggregation of small laboratories (the project groups) rather than one large laboratory, and thus prevented the brainpower and versatility of the entire Laboratory from being brought to bear on Laboratory projects. There were also specific disadvantages and difficulties. The NOL organization structure had to be changed constantly to meet the changing project structure, and this created serious personnel and morale problems. Project groups tended to be self-perpetuating, and when one project was completed and there was no obvious next project for that same group, its members tended to hang on to the old job by making desirable but nonessential refinements. A project group needing the services of a technical specialist was more likely to hire one than to obtain the part-time services of a similar specialist assigned to another project group.

In 1954 the NOL directors faced up to the basic problem, and the following year took the first step in a two-phase management-improvement program that was completed in June 1957. The basic ideas were not new, but NOL adapted them to the special requirements and considerations of military R&D activities and added some refinements. The central concepts of the program were (1) to restrict line elements to the performance of clearly defined line functions; (2) to set up a temporary staff group to direct and coordinate each major project assigned to the Laboratory; and (3) to integrate evaluation work with design work, and perform both concurrently.

Major Concepts

These were the important decisions that were reflected in the new setup:

1.—NOL's functional line organization would be retained, but each line element would perform (as required) only its regular functional tasks on all projects, rather than performing varied functional tasks on some projects.

2.—Responsibility for a given project would still be assigned to a line official (usually a department or division chief), but his own line element would not be expected or permitted to do all the work on the project—they would perform only their regular functional tasks in connection with it, and the other functional tasks required on it would be performed by other appropriate line elements.

3.—A project manager would be appointed, out of the engineering line organization, for each major project assigned to the Laboratory. He would usually be a subordinate of the line official holding responsibility for the project. For the duration of the project he would be relieved of his regular line duties and responsibilities and become, in effect, a "staff system engineer" for the project. The project manager's job would be to plan, schedule and coordinate the work done on the project by the various line elements; to keep the "responsible line official" informed of its progress; and with the line official, make sure that it was proceeding on schedule and that the work on it was being properly and efficiently performed. When the project was completed, the project manager would resume his regular post in the line organization.

4.—NOL evaluation specialists would participate in all phases of each project, from inception to completion, and would perform evaluation tasks and

Policies and Procedures For Project Managers*

I. Policy

A. Any project which has as its objective the release to production of a weapon system or weapon component is called an Ordnance Project. It is NOL policy to assign primary cognizance of an Ordnance Project to one line unit of the Laboratory for Phase II.

B. It is NOL policy to have project managers on Ordnance Projects or groups of Ordnance Projects.

C. Project managers may also be appointed for non-Ordnance Projects if deemed appropriate.

II. Appointment

A. Project Managers will be appointed by the Technical Director upon consideration of line recommendations.

B. Project Managers will be appointed for Ordnance Projects when NOL determines it will undertake development (Start of Phase II).

C. Project Managers on Ordnance Projects will be located in the organizational unit designated as "Lead Unit."

D. Project Managers will be appointed for non-Ordnance Projects when need is determined.

III. Responsibilities (To the Line Supervisor of the Lead Unit)

A. Exercise leadership in the planning and execution of the project.

B. Recommends, after consultation with departments concerned, a detailed technical plan for carrying out the Project, considering the following, and using the information from Phase I as a starting point:

1. Military characteristics.
2. Design approach.
3. Supporting research requirements.

C. Submits and maintains BuOrd and/or NOL task plan covering research, development and evaluation through line channels.

D. Submits an initial forecast of requirements for personnel, facilities and funds, through line channels.

E. Ascertains that service requirements for shop, computing, contracts, etc., are properly recognized and planned for.

F. Prepares, jointly with the evaluation and test departments concerned, a complete and detailed plan for evaluation to be submitted through line to the Director for approval.

G. Ascertains that appropriate design disclosures, including drawings, inspection requirements, procedures, and specifications are prepared on appropriate time schedule and that all waivers and deviations have had proper review by engineering department concerned.

H. Ascertains that appropriate reports of the various phases of the development are prepared and prepare the required periodic progress reports.

I. Brings to attention of appropriate management the effects of waivers, deviations and changes on other items of ordnance having common usage, so that appropriate action can be taken.

J. Prepares release letter at completion of project.

K. Resolves technical and administrative disagreements and problems through conference, or refers to higher authority for decision.

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* *From the official NOL directive.*

make design suggestions as the development work progressed.

How it Works

The project manager, being a staff man, does not have direct line authority, and at first glance this would seem to make the PM a weak appendage to the whole setup. But in actual practice, the way he functions gives him far-reaching, decisive control and direction of the project. This can best be described by a run-through of a typical NOL project.

Project ideas come to NOL from almost everywhere—the Fleet, the Bureau of Ordnance, NOL's own departments and personnel, outside agencies, etc. Each project goes through four steps to become finished hardware: study, development, pilot production, and mass production.

The first two of these phases are NOL's responsibility and are performed by the Laboratory. In the latter two phases, NOL participates at the request of the Bureau of Ordnance.

When the study or "operations research" phase of a project begins, a group of perhaps six carefully selected NOL scientists and engineers is assembled. Usually, the chairman is a NOL research man with a strong, broad background in the major scientific field involved. This group spends perhaps three to six months studying the feasibility of the basic idea and discussing it with their own people and with NOL's "ordnance applications officers"—naval officers with technical backgrounds who also have actual military operations experience. The result of this study is the group's report, which includes their estimate of the project's military value (in terms of kill probabilities, operational usefulness, etc.) and the time and money required to develop the weapon, together with their recommendation on whether NOL should go ahead or drop the idea. (About one out of every five is ruled out.)

If the NOL management can tell where the feasibility study is headed, the probable project manager is made a member of the study group. However, the PM frequently is not selected until the study is completed and the development phase begins—*i.e.*, when the project gets the go-ahead signal.

The project manager digests the study group's report, discusses the project with the various line officials whose groups will participate in the development work, reaches agreement with them on the nature and extent of their participation and prepares a comprehensive work plan for the project.

Once the NOL top management approves the PM's proposed work plan, his earlier agreements with the line officials become line commitments, and the line officials are expected to carry them out.

As the work progresses, the PM can make additional agreements with the line officials that may modify the work plan, as long as such changes do not upset the basic work plan or adversely affect the project schedule. Beyond this, the PM has no direct authority over the line organization and depends largely upon leadership and persuasion to get the work done. But he has one "big stick" that can be used if necessary: his closeness to the line official who holds responsibility for the project. Rarely does this line official overrule his project manager, and the line official can bring pressure to bear if necessary on other line officials if the work is not moving.

The real working advantage that the PM has is that he alone knows all about all aspects of the project. He sees to it that the work progresses smoothly and effectively. If his requests to the various line elements are kept within the approved work

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L. Continuously reviews all plans and recommends change as need is indicated.

M. Keeps management completely informed on progress; funds, major decisions, etc., throughout program.

N. Represents NOL as senior member of BuOrd task team, and on other occasions as directed by line supervision.

O. Follows work of all related contractors, visiting plants and holding conferences as required.

P. Evaluates progress and worth of task on a continuing basis, and recommends changes, as appropriate, to the line organization.

Q. Reviews or is kept informed of all incoming and outgoing correspondence.

R. Desired design changes which will produce a change in the MC are to be brought to the attention of the Director via the line. The Director may reconvene the original study committee to provide information for negotiations with BuOrd and Chief of Naval Operations on the proposed changes in Military Characteristics.

IV. Authorities

A. Makes day-to-day decisions where necessary in implementing the plan other than those resulting in changes in desired military characteristics, manpower, and funds required, and major schedule dates.

B. Will be assigned signature authority and fiscal approval authority appropriate to organizational position of Project Manager on a per case basis.

C. Approves all drawings, inspection requirements, procedures, and specifications before official authentication.

D. Makes recommendations to BuOrd on waivers and deviations.

E. In dealing with BuOrd and other outside agencies has authority to commit NOL either orally or in writing within his signature authority and within the scope of the approved plan. (Subject to III M.)

Responsibilities of the Line for Assisting the Project Manager

It is the responsibility of the line, and especially of the department Chiefs in all departments, to assist the project manager in bringing his project to a successful and expeditious conclusion. To implement this the line department should:

A. Furnish its plans and schedules to the project manager, discuss with him the fit of these into the system, and make every effort to come to agreement as to changes required for this purpose. This includes plans for expected performance and operation of components as well as manpower, money and dates.

B. Take initiative in working with other line units with whom they have development interfaces and keep the project manager informed.

C. Furnish timely progress information and technical reports to the project manager.

D. Route all correspondence which affects the project via the Project Manager.

E. Handle all actions and changes for contractors and BuOrd via the project managers.

F. Furnish representation and contribute effort to system meetings with the project manager and to studies recommended by him and approved by the Technical Director and station Commander.

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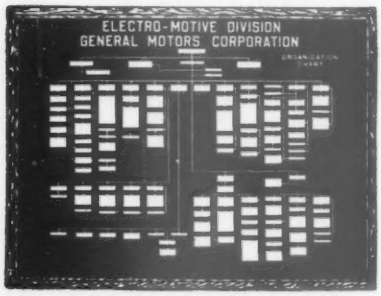

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PHASE TITLE	APPROXIMATE RELATION (IN TIME)	PARTICIPATION	PROJECT LEADER DURING PHASE	PHASE OUTPUT	REVIEWED BY
I. STUDY		NOL DEPARTMENT REPRESENTATIVES AS APPROPRIATE, AND AN ORDNANCE APPLICATION OFFICER COMPOSING A STUDY COMMITTEE	CHAIRMAN OF STUDY COMMITTEE. USUALLY A DIVISION HEAD, OR ABOVE, SELECTED FROM RESEARCH AREA	(1) A REPORT ON FEASIBILITY AND DESIRABILITY. IF FEASIBLE AND DESIRABLE, FURTHER: (2) A TENTATIVE SET OF M.C.'S, DISCUSSED WITH BUORD AND CNO FOR CONCURRENCE (3) A GROSS TIME AND COST ESTIMATE FOR DEVELOPMENT	C/D, VIA DR, DE
II. DEVELOPMENT					
A. DESIGN		THE NOL DEVELOPMENT DEPARTMENT HAVING PRIMARY RESPONSIBILITY. OTHER DEPARTMENTS WILL ASSIST AS THEIR FUNCTION IS REQUIRED	PROJECT MANAGER SELECTED FROM DEPARTMENT HAVING PRIMARY COGNIZANCE, FREQUENTLY A DIVISION HEAD IN LARGER PROJECTS	(1) DESIGN DISCLOSURES (2) RECOMMENDATION FOR RELEASE TO PILOT PRODUCTION	C.D, VIA DE, DR, DS AND PARTICIPATING DEPARTMENTS: (1) FOR AUTHORIZATION OF EPP (2) FOR APPROVAL OF ANY RECOMMENDATION TO CHANGE M.C.'S, BASED ON MATERIAL SUBMITTED BY PHASE I STUDY COMMITTEE (RECONVENED) AND PROJECT MANAGER (3) FOR APPROVAL OF A CHANGE IN PHASE II COMPLETION DATE (4) FOR APPROVAL OF RELEASE LETTER
B. PRODUCTION ENGINEERING AND MANUFACTURING OF EPP	EPP	OUTSIDE CONTRACT ASSISTANCE, PREFERABLY CENTERED IN ONE PRIME CONTRACTOR			
C. EVALUATION	EPP EVALUATION	EVALUATION DEPARTMENT WITH EMPHASIS ON EARLY PARTICIPATION			
III. PILOT PRODUCTION (MODELS MADE WITH FULL PRODUCTION TOOLING)		NOL WILL OBSERVE OPDEVFOR TESTS, AND WILL ADVISE MO ON PROBLEMS ON REQUEST	OUTSIDE NOL		
IV. PRODUCTION		SERVICE TASKS AT NOL	OUTSIDE NOL		

The NOL Phase Plan

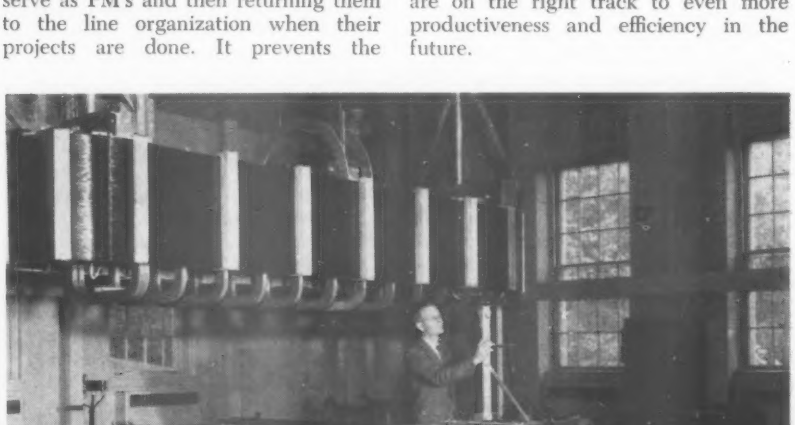
Key: EPP, evaluation proof production (small lot made with production-type tooling for BuOrd evaluation); C, Commander; D, DR, DE, DS—Director and Directors for Research, Engineering, Services.

plan (that the line officials have previously agreed to), he usually has no trouble getting the work done. If it is necessary to have work performed that is not included in the work plan, the PM must get an OK from top management to change the plan.

When asked why the project manager is not given more direct authority, NOL management replies, "If the PM had direct line authority, he would not only run the project, but would also run the various line elements that are doing the work. The result, from a management standpoint, would be compounded confusion. And everyone would want to be a project manager."

Several important advantages are gained by appointing line personnel to serve as PM's and then returning them to the line organization when their projects are done. It prevents the establishment of a personal dynasty or empire by the project manager and of a "ruling class" of PMs. It gives the line man an opportunity to acquire staff experience, demonstrate management ability and develop more versatility. It furnishes the NOL top management a chance to watch and evaluate his management potential. It aids in making the new system work throughout the Laboratory, by helping to educate Lab personnel as to the actual operation of the system. It establishes better rapport between the NOL line and staff elements.

The NOL management is gratified by the benefits to date, and feels sure that although the system is not the final answer (nothing ever is), they are on the right track to even more productiveness and efficiency in the future.



Highly accurate magnetic measurements are taken in Electricity and Magnetism Research division. Chief C. Leland Parsons here aligns a ship model for measurement.

Armed Forces Management Association Names First Executive Director

THE Armed Forces Management Association took a key step in its expanded program this week with the announcement that Vice Admiral Harry E. Sears will become AFMA's first full-time executive director in mid-August.

The new executive director will establish his office in the Pentagon on 15 August with a small secretarial staff until permanent office arrangements can be developed in downtown Washington. He expects to travel considerably to meet the chapter membership, military installation commanders, leaders of industry and other organizational directors in the furtherance of

VP's Ward (left) and Gent

the expanded AFMA program—outlined last month in ARMED FORCES MANAGEMENT.

Says AFMA of Sears: "Admiral Sears brings to his new job a multitude of unique qualifications and an opportunity to further apply them in service to his country, as well as industry. He will be a pivotal member of the AFMA team dedicated to objectives and services already thoroughly endorsed by the Secretary of Defense and other top defense management."

Sears retired recently from the Navy, after 34 years service, including combat operations in two wars. The nature of his military service was best summarized in a letter to him, on the eve of his retirement, from Chief of Naval Operations, Admiral Arleigh Burke. Stated Burke:

" . . . I join your other friends, shipmates and associates in wishing you many years of continued success and happiness. We all recognize and deeply apprecite the many contributions you have made to the Navy during your brilliant career. We thank you for a magnificent job.

"Your superlative performance as a combat pilot and as a combat leader earned you a multitude of decorations including the Navy Cross. Far more important than these tangible recognitions were the effects your continuing displays of courage, skill and leadership had on your fellow fighting men. Your courage, leadership and devotion to duty since World War II have been equally inspiring. These same qualities have enabled you to turn in an outstanding performance in the many important assignments you have held. The keen logic and analytical approach you applied to each job always led to another of increased responsibility.

"We hate to lose you. We are grateful, however, that we have your fine

Executive Director Sears

career to serve as a guide for young officers of the Navy. Your reputation will long serve as an inspiration for all personnel of the Navy . . . "

The new executive director has had eight commands, including the aircraft carrier Coral Sea, which won the battle efficiency trophy under his management. Earlier, during World War II, he organized, trained, and led in Pacific combat Bombing Squadron 104, the Navy's famous "Buccaneers" Liberator Squadron, which received the

v-p's Hyde and Dwyer

coveted Presidential Unit Citation for "changing passive, defensive search operations into a daring and powerful offensive."

Following the war, he helped organize the Naval Air Reserve Training Command with units throughout the country. This program provided urgently needed aviators and other aviation personnel for the Navy in the Korean Action. After a tour of sea duty, Admiral Sears next served as Director of Public Information for the Navy. He was Chief of Information when the Korean War broke out, and shortly after, joined the Pacific Fleet. He directed the Pacific Fleet Evaluation Group, studying Navy and Marine combat operations at first hand, and flew a number of combat missions.

In more recent years, Admiral Sears has served as Director of Aviation Training for the Navy, commanded a carrier division in the Sixth Fleet and served on the staff of the Commander, Allied Forces Southern Europe, a NATO command, in charge of logistical matters.

Other assignments have included

General Chairman Randall (left) and v-p Vice Admiral Clexton

serving as personal pilot for the late James V. Forrestal, Admirals Stark and King, Mrs. Roosevelt in her South Pacific war zone flight, and for many other dignitaries. Pictured on this page with him are some of the new APMA officials, announced last month.

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How Fort Eustis Trains To Improve Army Transportation

by Colonel A. W. Lyon
Commandant
Army Transportation School

IN the words of Major General Frank A. Heileman, former Chief of Transportation, the United States Army Transportation School at Fort Eustis is "the heart of the Transportation Corps." It is here where all officers newly commissioned or recently assigned in the Transportation Corps perform their first service, learn the doctrine, procedures and techniques essential to a basic understanding of their future duties.

Here also students are inculcated with the Corps' esprit and traditions; and they are motivated to provide the combat, technical, and administrative elements of the finest Army in the world with the best transportation support that progressive minds and alert spirits can produce.

The United States Army Transportation School is an integral part of the Army school system. It, with its sister service schools, forms part of the foundation upon which the Army school structure rests. Selected graduates of its higher level (advanced) career courses may go on to the Command and General Staff College, the Army War College, or other of the senior service schools.

Located at Fort Eustis in historic Tidewater Virginia, the Transportation School is an organizational element of the Transportation Training Command. Its missions include:

(a) Conduct of resident and nonresident instruction to selected individuals.

(b) Assistance in the development of doctrine, procedures, organization and techniques applicable to transportation activities.

(c) Preparation and revision of training literature and tables of organization and equipment.

The T-School, as it is familiarly called, is housed in 16 modern, permament-type buildings specially designed and constructed for the purpose. These structures are augmented by other facilities which together constitute one of our Army's finest school plants. Also available to the School, on an "as required" basis, are facilities of Fort Eustis, Fort Story, and Camp Wallace. The School has no demonstration troop units assigned, but troops of the other elements of the Transportation Training Command are made available, when required, to participate in special demonstrations and field exercises.

In fiscal year 1958 thirty-eight separate resident courses were conducted. These 38 courses included a total of 165 classes, with an input of 1,600 officer and 3,400 enlisted students. In addition, some 278 students from the armies of 28 allied nations were enrolled in various courses throughout the year.

For the new fiscal year the Transportation School has programmed for 36 resident courses. These courses will include 142 separate classes and a student input aggregating approximately 1,630 officers, 3,080 enlisted personnel, and probably well over 300 foreign students. Of particular interest in this connection is a projected special advancéd transportation course to be given in Chinese to selected senior Chinese officers. Two such classes are presently planned for calendar year 1959.

Instruction at the Transportation School is conducted by officers, enlisted men and civilians. All instructors are carefully selected, primarily for professional qualifications in their respective fields and for their ability to teach. Before undertaking actual classroom work each instructor is required to take a course in Instructional Methods (our so-called "Charm School"). Here the beginner must qualify for his teaching assignment under the watchful eyes of professional instructors. Continued high standards are assured by monitoring classroom presentations

Students at Army's Transportation School both remove (left) and learn the details (right) on the H-19 helicopter engine, one of many T-school training aids.

Helicopter maintenance is only one of 38 courses, 165 classes at the T-school.

and by careful analysis of student reaction. By these methods, high faculty standards and esprit are assured.

The average TC officer returns to the Transportation School two or three times during his Army career. During these schooling periods the student may take higher level or refresher instruction, or he may take courses in specialty fields. One may also receive instruction from the school by participation in its Extension Program, or by review of various training literature which the School prepares and disseminates widely. Transportation officers may also learn much after graduation by viewing the many demonstrations and exhibits produced at the Transportation School and displayed at Fort Eustis and elsewhere about the country.

The residence program for officers includes three career courses—basic, company, and advanced. These are the core of the school curriculum. Our basic course, TOBC as we call it here (Transportation Officer Basic Course), is given almost exclusively to newly commissioned reserve officers serving their obligatory six-month or two-year tours. It is a nine-week course. After completion of this course, the officer is given an appropriate field assignment for the balance of his active duty commitment. We have programmed for nine of these TOBC courses during the year. Classes average 80 officers each. Two such classes are currently in session.

Our company officer course, TCOC (Transportation Company Officer Course), lasts for 21 weeks. It is generally the first branch course that our Regular or Career Reserve TC officers attend inasmuch as these officers have normally obtained basic level schooling at one of the combat arms schools. TCOC is given to the Regular or Career Reserve as soon as he comes to the Corps from the combat arm in which he served his first two years. Two such courses, beginning in July and January, are offered each year.

The Transportation Officer Advanced Course (or TOAC) is a 24-week course and is normally scheduled during the fifth to eighth year of an officer's service. It likewise is given twice each year. TOAC 1-59, now in session, consists of 62 Regular Army and Career Reserve and 20 allied officers.

A First

These six-month TCOC and TOAC courses are being offered this year for the first time. Their predecessor counterparts were of 34 to 36 weeks' duration and were offered once a year only. Each was supplemented by an abbreviated and condensed 12-week Associate Course designed primarily for reserve officers (career or active duty training) for whom the nine-month schooling period was generally impracticable. The condensation of the regular TCOC and TOAC courses to the shortened length is the result of a painstaking reappraisal emphasizing the "need to know" and eliminating that which is only "nice to know," or is repetitive or overlapping. The new courses are also more intensive, under the theory that the student can endure a stiffer pace for a shorter period. The "new look" in these courses is expected to prove more beneficial both to the individual and to the Army. The courses will be improved, the Regular officer and the Career Reserve officer will receive the same branch schooling, and School output from these courses will be doubled. A major dividend is the extra year of effective service that the Army will gain from the individual officer in the course of his career.

Enlisted personnel of the Transportation Corps likewise receive instruction and absorb Corps esprit and traditions by attendance at the Transportation School. A variety of specialty and supervisory courses are available to selected enlisted men. Here he may train to become a transportation movements specialist or a stevedore supervisor; a railway trainman or an aircraft engine repairman; a harbor craft deck officer or even a deep sea diver. In all, the Transportation School offers some 33 separate courses to enlisted personnel. The courses vary in length from two weeks (Air Transportability) to nineteen weeks (Harbor Craft Engine Operations and certain of the Army aviation maintenance fields).

In the conduct of all its training the Transportation School endeavors to employ the most advanced and effective techniques and training aids. In its academic type courses, the usual lecture is freely augmented by conference, panels, practical exercises, training films, and closed circuit television. The MOS or specialty and mechanical trades courses are usually conducted in shops fully equipped with tools, instruments and full scale prototypes or mock-ups of the equipment the individual is being trained to use.

Paralleling the resident instruction, the School conducts an extensive nonresident activity. Current enrollment totals 5,322. Most of these students are Reserve or National Guard personnel, but the enrollment includes many active duty personnel and students from other branches of the Army and the other Services.

The Transportation School is justly proud of its facilities at Fort Eustis, but it is most proud of its contribution to the mission of the Transportation Corps. Graduates of its courses are serving around the world at all operations and staff levels. It is contributing to the effectiveness and readiness not only of our own Army but to that of our Allies throughout the free world as well, who have well learned, in the words of the School motto carried upon its crest: "Per Scientiam Progredimur."

As a safety measure, the diving school maintains its own decompression tank, used to relieve effects of underwater pressure.

Army's "roughest" diving course is covered in 17 weeks at T-school. Here a student prepares to go under in the school's diving tank.

Tail fin lowered to prevent buffeting, the first B-52 ever successfully crash-landed wheels up waits for recovery.

What to do About the B-52

WHEN the first B-52 that ever successfully crash-landed wheels up ended its skin-searing 6,000-foot scrape along a Westover Air Force Base (Mass.) runway one day last Spring, the crew received congratulations for saving an $8 million aircraft.

But to the recovery team (99th Field Maintenance Squadron) it represented a 200-ton headache which had to be jacked into mobility and towed to a hangar—which like the landing no one had ever tried before. How they did it, in only 36 hours, makes as interesting a story, to maintenance officers, as the landing itself.

The recovery operation was accomplished in five stages: assessment of damage; lowering of tail fin to prevent wind buffeting; lifting aircraft; lowering landing gear; and towing to hangar. Here, in pictures, is how it worked.

Using flotation bags, seven portable blowers (with the help of 50-ton axle-type jacks at six points on the fuselage and 30-ton tripod wing jacks at the rear of the bomb bays and at points under the wings) lifted the bomber so taller tripod jacks could be used at nine key lifting points on the craft.

Under 1900 pounds of hydraulic pressure the landing gear was lowered, once the bomber was up high enough to permit it. (Regular landing gear system was by-passed since this was the primary reason the plane crash-landed.) Wheels down and jacks released, the aircraft was towed away. Carried on its nose—a yellow and black banner proclaiming "another quality job by the 99th FMS."

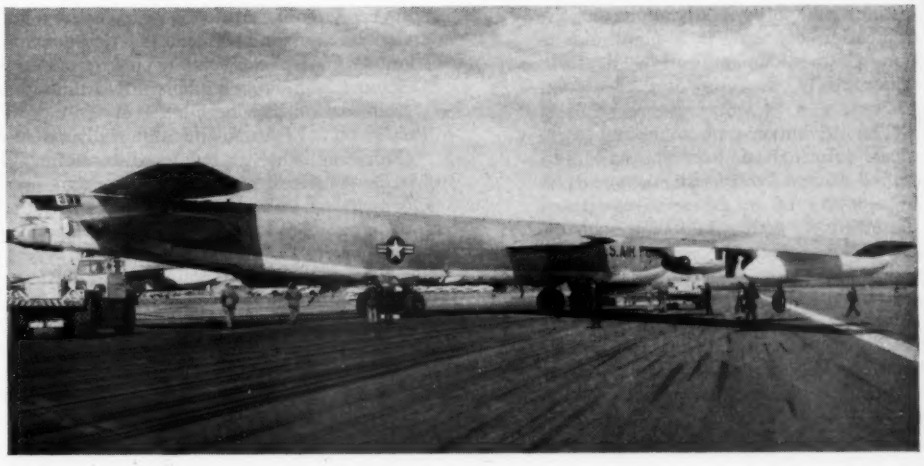
Rubber flotation bags, inflated under the wings, lifted the fuselage enough to permit placing jacks at key points.

With jacking underway, block and tackle rigging, at four key points, kept craft stabilized during the lift.

Five hours from start, B-52 is ready for tall wing-type jacks to raise it high enough for landing gears to be lowered.

One down and one to go—forward gear is lowered hydraulically along with shower of dirt scooped up during the belly landing.

With three steel mats under the wheels for stability, recovery team removes first jack from the fuselage.



Back on runway, 200-ton bomber is ready for hangar repairs, 36 hours after recovery crew first started work.

Unified Technical Information Departments:

What Are Their Advantages?

Sixth in a Series
by Roswell Ward

To a limited degree there has been a trend in the United States towards a unification of all technical information services within various manufacturing organizations. These services are responsible for the collection, interpretation, and dissemination of all technical information of company products, production, resources in equipment, manpower, research and development staff and facilities. Unified technical information services usually prepare material for all types of presentation, written, graphic, or in exhibit form. In the United States they usually maintain relations with the technical press and technical education, but work with industrial advertising agencies, public relations counselors, community relations and employee relations specialists, and labor-management specialists in obtaining for them necessary technical information. A typical check-list of a unified technical information service's responsibilities is shown on the facing page.

It is possible that some of the American manufacturers who have adopted unified technical information service have done so because the concept has been recognized and effectively used by leading European industrialists for many years. However, since little information on European information services in industry has been published in this country it is probable that many American manufacturers have independently developed the idea of "technical information unification" on their own. The fact that some industrialists so far are reluctant to release organization details or comparative cost figures, because they feel they have a distinct competitive advantage in the unification concept, is a good indication that such unification deserves wider study, analysis, and cost comparison.

The advantages of a unified technical information service, as interpreted to me by industrial executives or as observed in my own experience of setting up and supervising such organizations, may be summarized as follows:

1. The unified organization is equally suited for large, small, or medium sized manufacturers. The large manufacturers need it to avoid costly duplication, inter-departmental rivalry, lack of coordination in collection, interpretation and dissemination of technical information, unwieldy training and indoctrination programs. Small and medium sized manufacturers find these advantages, plus the fact that they cannot afford the cost of several specialized departments, each handling some one phase of technical information work.

2. A compact, well organized, technical information department lends itself to complete and clearly understandable interpretation of its functions to the entire organization.

3. The representatives of the unified technical information service can save the time of top management and other company personnel by making one contact to get basic technical data which may have a variety of technical information uses.

4. Outside organizations, customers, representatives of the technical, semi-technical and popular science press, technical societies, and technical schools and museums have one point of contact when they wish to obtain technical information from the company.

5. At a time when there are military or civilian budget cuts, changes in the volume of publication or presentation work required, or changes in the character of the company's products, it is much easier to adjust a unified technical information service to such changes. Both the department and its personnel are geared to carrying out a wide variety of technical information

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Check List on the Job Of the Unified "TI" Service

Instruction Books—Military and Civilian Equipment
- Operational Manuals (General)
- Flight Manuals
- Overhaul and Repair Manuals
- Illustrated Parts Lists
- Basic Training Textbooks
- Training Manuals for Secondary Schools and Colleges
- Outlines of publication specifications and contact procedures for use by associated companies and subcontractors

Sales Literature and Institutional Publications
- Equipment Catalogs
- Sales Promotion Literature
- Point of Purchase Sales Aids
- Description of Company Resources: Plants, Proving Grounds, Research and Development Facilities, Engineering Services, Technical Publication Services, Technical Representative Services, etc.
- Statements of company objectives, policies, and plans Stockholder reports
- Visitors Guides, Maps, Organization and Staff Guides, etc.

Employee Training Material
- Indoctrination and Information Guides for New Employees
- Manuals for specific employee groups
- Organization, Procedural, and Training Manuals for Technical Information Service Personnel
- Publications (factual and impartial) on Defense trends, Economic Problems, Foreign Affairs, Internation Trade, etc.
- Manpower Recruiting and Career Guides (Company only)
- Occupational Information on Types of Jobs Concerning Which The Company Would have Accurate and Authoritative Data. (This is for sons and daughters of employees, entry workers and for use of schools and colleges and public employment services.

Articles, Speeches, and Lectures for executives, engineers, and employees of any classification, who belong to technical, industrial, civic, or fraternal groups, women clubs, etc.

Product, Production, and Company Resource News or Basic Data for use by advertising agency, public relations counselors, etc.
- Technical News Releases (real news) and photographs, and films for news reel or TV use.

duties, functions and operations.

6. Unified purchasing with one point of contact for outside vendors, such as technical writing services, technical illustrators and art services, typographers, engravers, printers, photographers (if the company is not big enough to maintain a photographic department), training film producers, foreign trade, industrial, and other types of exhibits, etc. has distinct advantages and economies.

7. Both to the company and the individual there are advantages in the unified technical information department which can pay off in a number of ways as it is an old truism that "improved human relations usually develop better banking relations." Better relations with employees develop greater productivity, more effective work, more development of new and better ways of doing things, better team work, and better relations with civilian and military customers, the technical press, cooperating institutions, and vendors. Some of the specific advantages, inherent in the employer-employee relationship, are as follows:

(A) Service in a unified technical information organization is more interesting and challenging to the type of writers and illustrators who, in any setup, are of most value to the company. Technical writers often want to swing to less formalized types of writing, but seldom get the chance. News or feature writers often welcome every opportunity to learn more about the technical aspects of the company's work. The results are improved morale, greater ability to assume promotional responsibility in technical information or other departments requiring a knowledge of company products, and eligibility for higher salary ratings.

(B) There is an inevitable increase in the prestige and company-wide acceptance of information service personnel. Both their own development and a well planned indoctrination program for other departments, can transform the attitude of production men, designers, test engineers, service engineers, and company executives at all levels, from regarding writers and illustrators as a necessary evil and a sort of fifth wheel distraction to regarding them as essential interpreters of all of the company's technical accomplishments.

Company employees, at all levels and on all types of jobs, began to realize the importance of the technical information service and that "TI" staff members had status in the organization, a viewpoint which was heightened by identification badges showing they had access to all restricted areas, passes to carry brief cases and other material in and out of the plant—and around-the-clock access to the plant. (more on giving status and acceptance to the TI staff will appear in a later article in this series).

8. In a unified department one is likely to find writers with a purely engineering background and writers with a predominantly journalistic background. The engineer-writer worships facts, the journalistic writer respects facts, but is more concerned with giving them life, vitality and interest. Team activities by these two types of writers can contribute greatly to the effectiveness of all types of company technical information.

9. In developing travel, conference, and technical meeting schedules, the "UTI" Service concept can simplify company representation and cut costs. Often one "TI Man" can represent the company in connection with a number of technical information projects.

Unified services are made possible by several common denominators. Everyone in a technical information service must have a good basic knowledge of the company's products, their development, their production, and their application. Hence product, production, and application knowledge is one common denominator for all technical information service staff members.

The second common denominator is the functional similarity in data collecting, writing, editing, and illustrating, for whatever media is concerned. Regardless of subject matter, every staff member, within the limits of his special skills, must be an interviewer; an interpreter in written, graphic, or three dimensional form; and a constructive combination of a reporter, an educator, and a good judge of the best approach to use for the audience he has in mind.

A practical creative approach to technical information work is the third common denominator and that will be discussed next month.

Recorded interviews, technical news or forecasts, with company staff members, distinguished visitors, etc.

Spot news coverage, involving technical aspects of news releases, interviews with company executives and employees, etc. in case of emergency situations, unexpected announcements by outside organizations, etc. This may involve just checking on technical accuracy or may require supply of statements, photographs, etc.

Work in cooperation with top management, research and development staff, patent department, sales executives, and government or customer representatives on technical aspects of announcements of inventions, forecasts of new developments, etc.

Writing, Editing, Illustrating, and Publication Production Service for Other Departments

Improving readability, illustrations, layout, and final published form of engineering reports to accompany proposals.

Similar service in connection with renegotiation briefs, excess profits tax claims and other formal documents where technical accuracy and "popular science readability" are basic requirements.

In-service training in writing, editing, and graphic arts procedures for top management groups, middle management, sales and service personnel, military and civilian students assigned to company schools, etc.

Exhibits, Slide Films, Moving Picture Films, etc.

Collection, interpretation and reporting of product, production and technical resource data needed by staff specialists or outside services in these fields.

Note: A technical information service staff member should be one of those assigned to man exhibits. This provides a source of technical information when needed, permits staff member to observe "audience reaction" to exhibits, permits the staff member to study exhibit procedures of competitive companies.

Special Services

Development of teaching charts, breadboard models, cutaway and transparent models, etc. for exhibit and educational use.

Constant contact with trends, new ideas, new developments, etc. in the technical information field, plus cooperation and inter change of such information with professional groups in the field, specialized publications, etc.

Maintenance of historical files on the company's technical developments and achievements and of a biographical file on all engineering and research and development personnel.

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Washington Radio Station
Alexandria, Virginia
- Electronics Engineer (Radio) GS-9
- Maintenance Engineer GS-9

U.S. Coast Guard Headquarters
Washington, D.C.
- Supervisory Marine Engineer GS-13
- Supervisory Electrical Engineer (Shipboard Systems) GS-13
- Electrical Engineer GS-12
- Electrical Engineer GS-11
- Engineering Designer (Ship Construction) GS-11
- General Engineer (Marine Equipment) GS-11
- Structural Engineer GS-9
- Engineering Designer (Electrical) GS-9
- General Engineer (Marine Equipment) GS-9

U.S. Naval Avionics Facility
Indianapolis 18, Indiana
- Electronic Engineer GS-9
- Electronic Engineer GS-11
- Mechanical Engineer GS-9
- Mechanical Engineer GS-11
- Electrical Engineer GS-9
- Electrical Engineer GS-11
- Electronic Scientist GS-9
- Electronic Scientist GS-11
- Physicist GS-9
- Physicist GS-11
- Physicist (Mechanics), GS-9 and 11
- Structural Research Engineer, GS-9 and 11
- Electronics Engineer (Instrumentation), GS-9 and 11
- Mechanical Engineer (Ordnance) GS-12
- Analytical Statistician (General) GS-12
- Supervisory Librarian GS-11
- Accountant GS-11
- Digital Computer Programmer GS-11
- Bacteriologist (Medical) GS-9

U.S. Army Electronic Proving Ground
Fort Huachuca Arizona
- Supervisory Electronic Engineer (General) GS-14
- Supervisory Electronic Engineer (General) GS-13
- Electronic Engineer (General) GS-13
- Electronic Engineer (General, Radio) GS-12
- Electronic Specialist GS-13
- Mathematician GS-13
- Contract Specialist GS-10
- Contract Specialist GS-9
- Management Analyst GS-9
- Engineer (General) GS-9
- Investigator (General) GS-9
- Publication Editor (Physical Sciences & Engineering) GS-9
- Supervisory Librarian (Cataloging-Physical Sciences & Engineering) GS-9
- Employee Utilization Representative GS-9
- Recreation Supervisor (Arts & Crafts) GS-9

Industrial Relations Department
U.S. Naval Torpedo Station
Keyport, Washington
- Supervisory Electronic Engineer GS-12
- Supervisory Ordnance Engineer GS-12
- Electronic Engineer GS-11
- Electronic Engineer GS-9
- Mathematical or Analytical Statistician GS-9

1st Coast Guard District
Boston, Massachusetts
- Safety Engineer GS-11

2nd Coast Guard District
St. Louis, Missouri
- Electronic Engineer (Radio) GS-9

3rd Coast Guard District
New York, New York
- Civil Engineer GS-11

5th Coast Guard District
Norfolk, Virginia
- Electrical Engineer GS-11
- Electronics Engineer (Radio) GS-9
- Civil Engineer GS-9

7th Coast Guard District
Miami, Florida
- Electrical Engineer GS-11

14th Coast Guard District
Honolulu, T. H.
- Civil Engineer GS-9

17th Coast Guard District
Juneau, Alaska
- Marine Engineer GS-11 or GS-9

AIR FORCE VACANCIES*

Procurement Officer	GS-8	Ardmore, AFB, Okla.
Civil Engineer	GS-11	Barksdale AFB, La.
General Engineer	GS-11	Biggs AFB, Texas
Electronics Engineer	GS-13/9	Brookley AFB, Ala.
Supply Requirements Officer	GS-9	Brookley AFB, Ala.
Civil Engineer	GS-9	Brookley AFB, Ala.
General Engineer	GS-9	Bunker Hill AFB, Indiana
Mechanical Engineer	GS-11	Castle AFB, Calif.
Purchasing Agent	GS-9	Castle AFB, Calif.
Architectural Engineer	GS-11	Charleston AFB, S. C.
Accountant	GS-10	Charleston AFB, S. C.
Financial Management Officer	GS-9	Charleston AFB, S. C.
Accountant	GS-9	Clinton County AFB, Ohio
Safety Engineer	GS-11	Dover AFB, Delaware
Accountant	GS-12	Dyess AFB, Texas
Budget Officer	GS-11	Dyess AFB, Texas
General Engineer	GS-9	Dyess AFB, Texas
Aeronautical Rocket Power Plant Test Engineer	GS-12	Edwards AFB, Calif.
Contract Specialist	GS-12	Edwards AFB, Calif.
Electronic Development Technician (Instrumentation)	GS-11	Edwards AFB, Calif.
Mechanical Engineer	GS-11	Edwards AFB, Calif.
Electronic Engineer	GS-11	Edwards AFB, Calif.
Aeronautical Rocket Power Plant Test Engineer	GS-11	Edwards AFB, Calif.
Civil Engineer	GS-11	Edwards AFB, Calif.
Purchasing Agent	GS-11	Edwards AFB, Calif.

OVERSEAS VACANCIES**

General Engineer (POL Sys.)	GS-13	Germany
Civil Engineer	GS-11	Iceland

*Applicants apply direct to base where vacancy exists.
**Applicants apply to any Air Force installation.

AMC to Set Up Logistics School

Air Materiel Command will establish a **Central Logistics Education School this September,** in order to meet training needs brought about by technologically inspired changes in Air Force Logistics.

The new school will be located at **Wright-Patterson AFB, Ohio** under **Col. E. R. Magruder.** The move is being directed by AMC Commander **Gen. E. W. Rawlings,** and will be conducted by the Air Force Institute of Technology.

The school will accommodate 225 students at a time, and the first year's enrollment is estimated at 2000 students. There will be roughly 10 times as many civilian as military students attending the 24 classes which range from two weeks to nine months.

Courses to be offered include systems analysis and design, advanced logistics, executive materiel requirements, negotiation techniques, readjustment and quality control.

Top AMC Suggester Is Oklahoma Civilian

James R. Nichols of Oklahoma City Air Materiel Area is AMC's suggester of the year. The honorary title and a certificate from AMC Commander **Gen. E. W. Rawlings** were presented to Nichols for having had 19 suggestions adopted by AMC during 1957.

Also in Air Materiel Command, two men in the Aeronautical Div. have saved the Air Force $1.3 million dollars in purchasing integrated instrument systems for Century series fighter aircraft. William Lashley and Curtis Palmer, production and contract specialists, achieved the saving through consolidation of requirements and effective negotiations.

McElroy Sets Up Supply Center

An Armed Forces Supply Support Center, to monitor procurement of materiel items common to all services, has been ordered by **Defense Secretary Neil McElroy.** The new office will not do the actual buying or determine the various services' needs.

The center will **monitor the Federal Catalog Program, the Defense Standardization Program** and the **Defense Materiel Utilization Program.** Its director will be appointed by the Secretary of Defense, and operation is scheduled to begin in September.

Primary responsibility will be for "certain common supply functions of the military services," with particular attention given to eliminating "any undesirable inconsistency, duplication and overlapping" among supply operations. Administering the program will be a council including representatives of the four services, a Deputy Assistant Secretary of Defense and the director.

Top Peacetime Medal Goes to AF General

Maj. Gen. K. E. Tibbetts has been awarded the **Air Force Distinguished Service Medal,** the highest peacetime medal that the Air Force offers. Tibbetts will retire shortly after 30 years service. He is presently director of Plans and Programming at **Air Materiel Command Headquarters.**

The citation accompanying the medal lauded Tibbetts as the first Director of his office, and praised him for developing "a highly efficient organization geared to render effective and timely logistic support for known requirements and future trends in weapons systems, force structures, and concepts of warfare."

Medal-winner Tibbetts

Management Tips Given By Georgia Educator

Personnel relations and adequate motives were described as **two keys to successful management by Noah Langdale, Jr.,** President of Georgia State College, before the Third U. S. Army Civilian Personnel Officer's Conference at Fort McPherson, Ga.

Langdale told the meeting they "must realize humanity in the mass, under you, is important if you are to be a good manager. If you know how to manage, you have the universe in your hands."

He criticized executives who try to do "too much with too many people for too long a time," and warned against the danger of "empire builders" in any organization. One of the most effective means of controlling personnel, he said, is to act with legitimate motives.

He told the meeting it was necessary to "take the best elements you find in an organization and build upon them . . . then it is possible to set up a clear-cut chain of command and channel of communications."

Langdale gives management advice to Third Army

Dates to Circle

August 7-8
Annual Conference, Western Region of American Society for Quality Control—El Cortez Hotel, San Diego.

August 18-23
Seminar on Systems Engineering and Missiles Operations Research—Pennsylvania State University.

September 15-19
Instrument Society of America Automation Conference—Philadelphia, Pa.

September 30-October 2
Fourth Packaging and Handling Symposium—Washington, D.C.; organized by the Navy Department.

August 21
Technical meeting on Automatic Decision-making—Univ. of Calif. at Los Angeles: sponsored by Los Angeles chapter of ACM.

October 13-15
International Systems Meeting, Systems and Procedures Assoc.—Pittsburgh, Pa.

Oct. 16-18
The Institute of Management Sciences Annual Meeting—Philadelphia, Pa.

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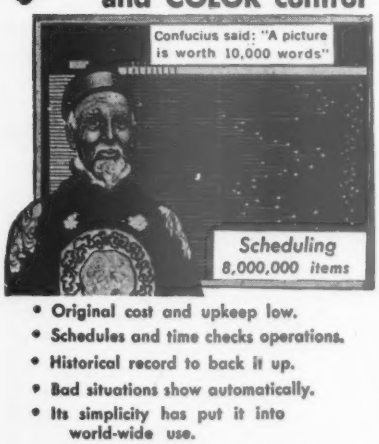

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Shift in Key Personnel

ARMY

Maj. Gen. H. N. Toftoy, Deputy Commanding General, Army Ordnance Missile Command, Huntsville, Ala. to Aberdeen Proving Ground, Md. in August.

Maj. Gen. Robert C. Butler, Deputy Commanding General, Army Communications Zone, Europe to Ordnance Ammunition Command, Joliet, Ill.

Brig. Gen. Horace F. Bigelow, Assistant Chief of Staff/Logistics, U.S. Army Japan to Office of Army Chief of Ordnance in August.

Brig. Gen. Robert C. Tripp, Assistant Chief of Transportation, Military Operations, to U.S. Army Transportation Terminal Command, Fort Mason, Calif.

Brig. Gen. Samuel E. Gee, Assistant Division Commander, 7th Infantry Division, Korea, to Office of the Chief of Staff, Army, Washington, D.C.

Brig. Gen. Joseph M. Colby, Commanding General, Ordnance Ammunition Command, Joliet Arsenal, Ill. to Army Ordnance Missile Command, Huntsville, Ala.

Brig. Gen. Paul A. Mayo, Commanding General, Army Finance Center, Fort Benjamin Harrison, Indiana, to Office, Chief of Army Finance, Washington, D.C. in August.

Maj. Gen. James H. Phillips, Chief, U.S. Army Security Agency, Arlington, Va. to Headquarters, U.S. Army Air Defense Command.

Maj. Gen. William W. Dick, Jr., Deputy for Army, Joint Task Force 7, Arlington, Va. to Office, Chief of Army Research and Development, Washington, D.C. in September.

Brig. Gen. George T. Duncan, Commanding General, Berlin Command, Europe to U.S. Army Element, Joint Task Force 7, Arlington, Va.

NAVY

Vice Admiral Thomas S. Combs, Deputy Chief of Naval Operations for Fleet Operations and Readiness to Commander, Eastern Fleet Frontier, Commander, Atlantic Reserve Fleet and U.S. Naval Representative, Military Staff Committee, United Nations.

Vice Admiral Wallace M. Beakley, Commander of 7th Fleet to Deputy Chief of Naval Operations for Fleet Operations and Readiness.

RAdm. Frederick Kivette, Assistant Chief of Naval Operations for Air to Commander, 7th Fleet.

RAdm. Roland N. Smoot, Deputy Chief of Naval Operations for Administration to Commander, U.S. Taiwan Defense Command.

RAdm. William G. Cooper, Office of Chief of Naval Operations to Commander, Antisubmarine Defense Force, Atlantic Fleet.

Vice Admiral Frank T. Watkins, Commander, Antisubmarine Defense Force, Atlantic Fleet to Command, 13th Naval District.

MARINE CORPS

Maj. Gen. James P. Riseley, Director of Personnel, Headquarters, USMC to Commanding General, Camp Lejeune, N.C. in August.

Brig. Gen. August Larson, Deputy Chief of Staff for Research and Development to Director of Personnel, USMC Headquarters, in August.

Brig. Gen. George R. E. Shell to Deputy Chief of Staff for Research and Development in August.

Brig. Gen. Roy M. Gulick, Commanding General, USMC Supply Center, Albany, Ga. to Quartermaster General of the Marine Corps.

AIR FORCE

Maj. Gen. Howell M. Estes, Jr. to Assistant Deputy Chief of Staff for Operations, Office of the Deputy Chief of Staff for Operations.

Maj. Gen. Lee W. Fulton to Assistant Deputy Commander for Resources, Air Research and Development Command, Andrews AFB, Md.

Brig. Gen. Charles A. Heim to Central Control Group (OSD), Headquarters, U.S. Air Force.

Brig. Gen. Prescott M. Spicer to Commander, 27th Air Division (Defense), Air Defense Command, Norton AFB, Calif. in October.

Lt. Gen. William H. Tunner takes additional duties as Executive Director, Single Manager, Operating Agency for Airlift Service.

DEFENSE DEPARTMENT

Edward E. Harriman, Senior Systems Engineer for Air Weapons Systems in Navy's Bureau of Ordnance, to OSD as Scientific Advisor to Director of Guided Missiles.

Operation Trainfire

A New Idea in Troop Training

by Dr. Francis E. Jones

IF WE apply the very best techniques of management art to a system of jobs, what will limit the efficiency that can be expected to result from action of that system? Will not the expected efficiency be limited by the degree of existing job proficiencies in the system?

The question is, then, how is management to insure, with the personnel resources now available to it, the accrual of a much higher degree of output job proficiencies per unit of input training time and expense? This question represents one of the paramount problems of management today, and particularly of management in the Armed Forces. Let us take a critical look at the time-honored approach usually followed to resolve the problem. Invariably this solution has consisted, in its larger part at least, of some degree of coordination between the uses of two well-worn devices: (1) the device of personnel selection and (2) the supplementary device of job simplification.

It is, of course, obvious that such a solution of the problem is geared to a situation in which the personnel supply far exceeds the demands of the asking job system, whether it is industry or the Armed Forces.

But, I ask the reader to imagine a situation of total war: the apparently possible disparity between our job requirements and our personnel resources becomes a truly frightening thought. From this, I believe that it can be safely concluded that we had best not depend upon the factors of personnel selection and job simplification alone to provide our insurance for the future.

What then, one may ask, of the possibilities from increasing automation? How will this factor affect job training and hence job proficiency? Can increasing automation simplify, or in some cases even eliminate, a substantial portion of jobs? Can this factor be depended upon to take up the critical slack which otherwise may exist between job requirements and personnel resources? I frankly do not pretend to know the extent to which we can expect automation to help us, but, currently at least, it does not appear that faith in automation as a *generally* effective solution can be warranted.

Only Hope

As I am sure that the reader will have correctly anticipated, about the only major hope remaining to us for resolution of our problem is the possibility of increased job proficiencies through improvement of training effectiveness *in itself*.

I believe, largely on the basis of experimental work that the Human Resources Research Office (HumRRO) has done for the Army since 1952, that we can obtain a much greater degree of trainee learning per unit of training time and expense without increasing aptitude requirements to support it. I further believe that we can do this without overshredding jobs or being oversolicitous about automation. I believe that *the key to solution of our problem—i.e.,* the key to increased training effectiveness in and of itself—*lies in the devotion right now of a much greater proportion of our research dollars and energy to basic inquiry into every legitimate unharmful means of better motivating our trainees.*

What we did in the past was tacitly to assume that the chronic dearth of motivation in training was somehow inevitable and unchangeable. The way we have learned to live with this situation has been to demand an excess of aptitude for every job to compensate for the deficit in motivation. Our theory has been, if we had just put it into words, "give me a guy to train that is so smart that he will learn something—even when he is half asleep." Our attitude has *not* been "Give me a guy who has aptitude enough to learn this task—if he will only try, and keep really trying. I will arrange the training course so that it will challenge every worthwhile motivational wellspring within this individual. I will accept the onus of that, and the proof depends upon *me*." Oh, no; I am afraid that we have avoided the real issue. We have looked at instruction from the teacher's point of view, not the learner's. True, we have occasionally spouted virtuous words to the contrary; we have paid some lip service to the problems and needs of the learner—and then calmly have done nothing to change his learning environment. And we are paying now for our neglect, although no one knows how much yet.

In the paragraphs that follow, I will outline and illustrate the kind of training treatment that some of us in train-

ing research have come to regard as the beginning of a cure. For concreteness, I will draw in the main upon two HumRRO sources. These are known as Projects MOONLIGHT and TRAINFIRE. Project MOONLIGHT resulted in an effective training course in night rifle marksmanship, a very difficult subject. Project TRAINFIRE resulted in a new course in day rifle marksmanship, which extensive test has proved clearly superior to the course in vogue for the past 30 years. Our Army has adopted and is now using both of these research products. Their use is now improving the proficiencies of many basic trainees and in time, when the changeover is complete from the old to the new systems, it will affect all who enter the Army. Further, our near allies the Canadians also have adopted the TRAINFIRE method.

It is likely that every reader of this magazine has had some experience with shooting—either the military or the civilian variety, or both—so this topic is particularly apropos to enlighten my points about training, since we all share some firsthand knowledge of it.

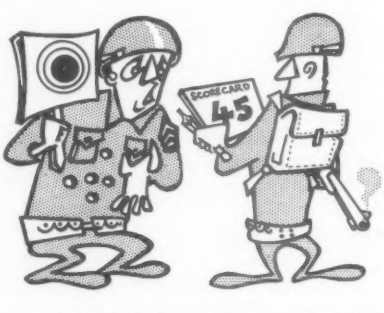
The interests basic to trainee motivation are most effective when self-generated and self-sustained. Training-course content must appeal strongly, then, to intrinsic interests of the trainee. For active, sustained and powerful motivational effects, this appeal must be made to expectancies, habits and attitudes of long and favorable standing. For it is on this basis almost alone, if not alone, that the trainee can be induced to sufficiently involve himself with the training situation to realize fully his learning potential. But in practice, how can the necessary conditions be met?

When we in HumRRO first started thinking about project TRAINFIRE, we asked ourselves a question along the following lines: "Why is it that our young American citizens of today are bored stiff in rifle marksmanship training? Can it be that they do not like to shoot?" Well, there certainly was some evidence that they did like to shoot, but not on the rifle ranges. How about spending money at the carnival in order to win Kewpie dolls? How about getting up before daybreak, riding 40 miles and walking 10, just to shoot some game that is not even eaten later? Now most Americans do these things, or would like to do them, when the opportunity offers.

Then there must be some profound difference between the situations existing in marksmanship training and in carnival shooting or hunting? Yes, there is. It is in the nature of the target. On the old-style rifle range, you fire a shot at a paper bull's-eye target. Minutes later you may be signalled the effect, after they have spotted the shot in the pits. The target itself does nothing. Not so a carnival or hunting target—it dies when it is hit, or keeps on running after it is missed. We therefore undertook, as our very first problem in TRAINFIRE, the development of a manlike target, to be remotely controlled so that it could be raised or lowered at will for surprise effect, and otherwise so constructed that it would die when hit by a rifle bullet—even when on its way up or down—just like an enemy soldier.

But just changing the nature of the target from a dull one to an exciting one, however important in itself, would not have been enough. The conditions of the shooter also needed a change. On the old-style course, the shooter takes up his position on an elevated ramp in order to fire. Closely crammed in upon the firing line between his mates on either side, he is restricted to limits of action so narrow and confined and devoid of all change that his natural desire for shooting soon begins to fade.

Consequently, in TRAINFIRE there are no ramps—the firing line is level with the rest of the ground. Just a foxhole and a stump at each firing position. With the trainee in full battle-dress (no padded jackets, if you please), defensive problems are fired



out of the foxhole and from behind the stump and also from an adjacent open space. Attack problems are fired with the trainee advancing at a walk. When his target appears, sometimes he must dive into the fox hole first, and then engage it (in this case the foxhole becomes a shell hole). Other times he must take quick cover behind the stump and fire from there around the side of the stump. At still other times he must take up an appropriate unsupported position to fire, and afterwards continue the advance. Since the target situation is kept ever changing, sometimes simulating an enemy advance or retreat, or random and surprise effects, our trainee is always on his toes—he has plenty to entertain him.

Further, the shooting problems in TRAINFIRE are graded in difficulty. As the course progresses in time, the increasing skill of the trainee is challenged ever more and more, since he starts with relatively easy problems and then rapidly works up to very difficult ones. The more he shoots the better he likes it. This is because he can see real progress, from problem to problem, from day to day. He knows that he must hustle to keep up with the training situation, but there are no sudden jumps in difficulty which would carry him so fast that he could not hope to succeed.

The gist of the illustration drawn from TRAINFIRE may be summarized, then, in the following way—all of our young men have seen many movies dealing with combat problems and they have heard veterans talk. They want realism in training. To satisfy them, a training course in rifle marksmanship must closely simulate the real thing as they conceive it.

As far as any training course goes then—no matter what the subject—if we are to follow my *first principle* we must deduce *the most realistic training* consequences possible from the mission that governs our training objectives, and then cast up the resulting course content into training so that it will optimally appeal to all important positive expectancies, habits and attitudes known to exist in the population to be trained. Further than this, we must organize our training problems in *an order of difficulty* so arranged that challenge to the learner is progressive and commensurate with his advancing capability and skill.

In consideration of the first motivational principle proposed, great stress was laid upon the importance of proper appeal to existing positive expectancies, habits and attitudes found in the population to be trained. Unfortunately, however, not all of the expectancies, habits and attitudes found in a population of trainees are potential facilitators of learning. Some of them are always distinctly negative with regard to training effect. These will act to debilitate, or to distract from, or otherwise to affect adversely the setting up and cementing of the systems of response that are the natural goals of the training course. Such negative attitudes must be conquered therefore, so that postive effects may proceed unimpeded to achieve their fullest advantage in the end. In order to conquer negative attitudes we must first, of course, recognize them as such. Then we must isolate them from others of their kind, so that we may anticipate their specific effects. And last, we must devise means for their demise, neutralization or other counteraction.

Let us draw again upon TRAIN-

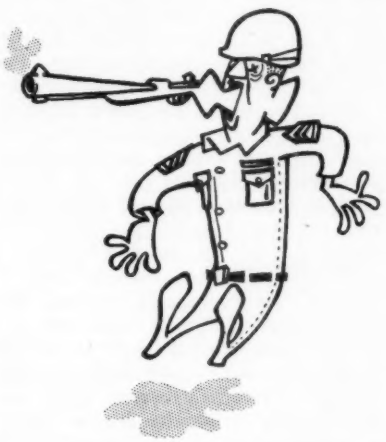
FIRE, for illustration now of the principle that negative attitudes must be conquered. As every trainer in the subject will attest, one of the greatest bugaboos in rifle marksmanship instruction is the flinch. This habit so distracts the necessary skills of the shooter that he can achieve no further progress until he has learned to overcome it. Consequently, much trainee and instructor time and trouble is involved in training shooters out of the flinch, once they have fallen heir to it.

But why allow flinching to occur in the first place? Or, if this is not possible, why not cut down on its incidence? Or so we reasoned in planning TRAINFIRE. Now it seemed reasonable to suppose that the basis of flinching might be fear, in its effect upon training a negative and debilitating attitude generally. According to this hypothesis, if a man fears the noise or kick of the caliber .30 rifle, he may flinch. There is also an additional closely related problem. Trainees who are originally completely unafraid may, through carelessness or inattention or distraction by some other event, fail to hold their rifles properly snug. When concentrating upon aiming or upon speed in getting off the shot, it is easy for this to happen. If it does happen, a nice "pinky" on the collarbone may be the result, and the consequent sensitivity to shooting may then produce a flincher. We resolved that both of these possibilities must be avoided, insofar as we could arrange it.

In TRAINFIRE we attacked the problem by a demonstration on the first day of firing. The demonstration starts with questions to the trainees, asked by the instructor to find out what fears they may express concerning the rifle. When questioned, some of them usually do express varying degrees of fear. As an extreme case, I recall one recruit who professed to believe that the rifle was never fired standing, because it would kick a man down! Where he had derived this misinformation I did not learn, but I have no reason to doubt the sincerity of his initial conviction. Once the trainees have expressed their fears and misbeliefs, the instructor calls upon a very small and insignificant looking member of the training cadre to come forward and fire the rifle in the "antifear demonstration." In full view of the assembled trainees, this individual (a frail type weighing about 125 pounds) proceeds to fire the rifle. He fires it first with the butt pressed against the thigh of his leg. He then fires it with the butt in his stomach. Finally he fires it with the naked buttplate pressed firmly against his chin! The trainees know that the cadreman is not firing blanks either, for he has loaded the rifle with full rounds before firing, and they saw him do this.

After the exciting but uneventful termination of this exercise, it is explained to the trainees that "Never, never, never under any circumstances can the rifle hurt you, so long as you hold it firm and snug, so that both the rifle and your body make one unit of mass. Any slack between the two, however, and you may get a hard kick which may start you flinching."

Now there is no known way as yet to prevent *all* men from flinching; some will do it in spite of the best



precautions. But in TRAINFIRE the incidence of flinchers was and is markedly decreased by starting the men off as I have described. A proper appreciation of the physics of recoil helps. At the end of our demonstration, the rifle, held tight by a cadreman, is fired butt to the shoulder of several trainee volunteers in succession. This clinches the effect.

A prime need in any course of training is for the trainee *to know precisely what he is expected to learn.* As a necessary first condition for this knowledge, he must be shown, in a way that induces belief and acceptance, just where in the hierarchy of skill he stands when the course begins. If a hundred men are taking the course, they will all start from different points within this hierarchy.

Not only should each individual taking a course be shown from whence he actually starts in skill, he also should be shown exactly where he is expected to go in skill within the same hierarchy. He must then be encouraged to compare these two points on the skill continuum. This comparison will enable him to define the task ahead in realistic terms of performance: *i. e.,* he must advance in skill from what he can now do to what will later be expected of him.

After the trainee has defined his task, by locating his own actual starting point and the expected end point within the hierarchy of skill, the entire content of the course should be outlined to him, from start to finish, as a series of logical and economical steps designed only to help him move from where he now is to where he wants to go.

In project TRAINFIRE, the principle of *orienting the trainee within the hierarchy of skill* receives the following application. On the first day of firing, the trainees are permitted to fire on both kinds of target utilized throughout individual training and qualification. These are (1) the small bull's-eye target, used at 1000 inches to teach the fundamentals of marksmanship; and (2) the man-sized popup target, used in field firing and later on in testing. Prior to firing his first rounds at these targets, the trainee is given only sufficient instruction to make the exercise intelligible and to get the rounds out of the barrel of his piece safely. He is allowed to proceed therefrom strictly according to his own manner, with no interference or advice whatsoever from the training cadre.

Now this point is crucial. Advising the trainee at this stage runs the serious risk of causing the whole exercise to fail in its purpose, because any poor result that he obtains in shooting will not be accepted by him, but instead will be blamed upon the interference and advice received. "If they hadn't messed with me, I could have done better," etc. When the trainee finishes his first firing, he is given the targets upon which he fired, properly marked and scored. A number of carefully selected and trained experts from the cadre are now brought forward to fire the same problems under exactly the same conditions as did the trainees previously. The trainees watch the experts fire. The targets fired upon by the experts are then properly marked and scored. The trainees finally compare their own results with the results produced by the experts. They are told, "You have demonstrated to yourself in a free situation what you are now able to do in the way of shooting. You each know exactly where you stand. You also have seen, from the performance of the training cadre, what you will soon be able to do. The only objective of this course of training is to move you from where you now are in skill to where you want to be."

The steps of the whole course, in synopsis, are then explained and demonstrated to the trainee. The point is made that these steps are the best means of rapid transit up the hierarchy of skill from wherever one is at the beginning to where all will be in the end.

Trainee appreciation of any important, key or crucial point in training is

best realized in practice by setting up an exercise wherein the individual demonstrates to himself, by virtue of his own performance in a free situation, the validity of the point.

Let us draw on project MOONLIGHT for the best example of the principle we now consider. The trainee comes to the course in night rifle marksmanship instruction after he has gained considerable skill in the day art. By day he has been hitting popup targets with ease up to the range of 300 yards away. When he is told that the night problem is to hit similar targets at the much shorter ranges of 50 yards and under (that is, in starless and starlight conditions), he thinks that this will be a "breeze." Little does he realize that his day method of shooting, which is dependent upon discrimination of his rifle sights, will not only absolutely fail him here but, even worse, will lead him into positive error. Nor can he be successfully "just told" this fact.

Therefore the first period of instruction in night firing consists of letting the trainee try to hit night targets by use of his day method of sight alinement. He proves to himself, to his own satisfaction, that it cannot be done this way. But only after his failure in this exercise is the trainee really open to progress in learning the pointing technique that will finally solve the night problem for him.

It is odd that one can demonstrate a concept verbally and even graphically to trainees, and that they will apparently come to understand it perfectly—they can now explain it back to the instructor—but then they will oftentimes go right ahead in the training situation and act as if they had never heard of it. Usually this happens because the instructor has neglected properly to provide prior experimental referents for the words (or the picture) used to introduce the concept.

There is a good illustration in MOONLIGHT. Even after the trainee has discovered that he cannot hit night targets by the use of day method, you still cannot always "just tell him why," and expect it to bring about a change in his reaction. So the following exercise was set up in MOONLIGHT. At a distance of 50 yards in broad daylight, the trainee is told to shoot at a bull's-eye a large clearly visible bull's-eye of about 20 inches diameter. The only restriction is that he is furnished a rifle with no sights, front or rear. (This is to simulate the nighttime condition when he cannot see his sights.) He is told to aim carefully at six o'clock on the bull and to fire a shot group of three rounds. Invariably, the group turns up high on the target frame, way above the bull.

But when now retold the source of the night firing error, because he has obtained clear experimental referents for the concept, our trainee believes and will act upon his belief. He will now try hard to learn the night pointing technique. But we could not have successfully "just told him so" in the first place, as experimental results have shown time and again.

The Backup

In any training course in which the trainee is called upon to build up successive layers of skill from the simple to the complex, it often happens that individuals suddenly begin making too many mistakes at the higher levels of performance, and apparently will flounder on from bad to even worse if left alone. For this reason, means must be built into the course content to take such individuals back to a simpler level of performance, where analysis of their difficulties not only can be assured to the instructor but also will be discovered by self-demonstration by the trainee.

In TRAINFIRE field firing, an individual suddenly falling too far below the expected norm for that stage will be returned to the 1000-inch range immediately. Here analysis of his difficulty is uncomplicated by the effects of distance, weather, time pressure, and terrain. Here he will go through preliminary exercises again, until the exact source of his particular trouble is uncovered. He will then be quickly retrained in his weak point before being returned to field firing. In the long run this corrective measure saves both training time and trainee confidence.

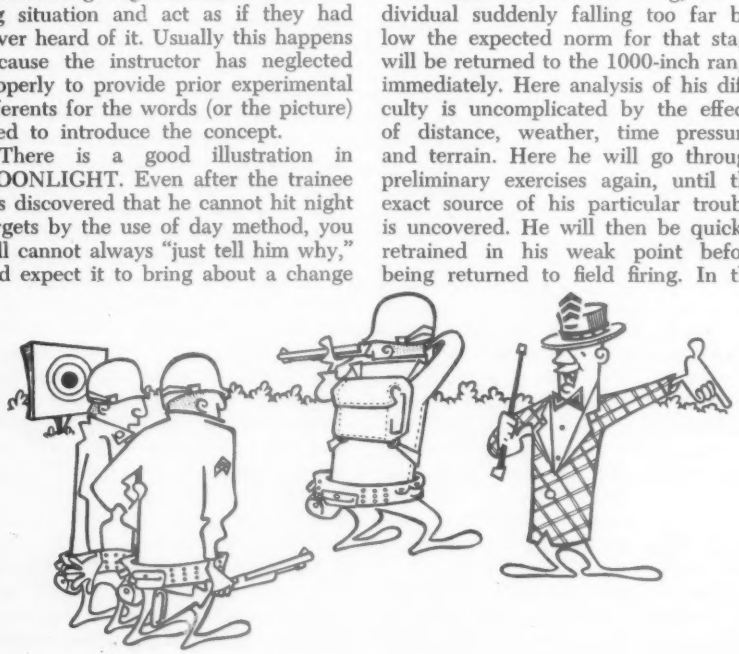
In any training course, there really are usually only a few vitally important points to remember. From the very start these vitally important points must be isolated and properly highlighted for the trainee. Then everything else in the course, every part of every exercise, must be chained directly to them.

For example, in rifle marksmanship training (the day phase) the key points to remember are: (1) grouping; (2) battle zero; (3) hold off; (4) target detection. Unless a man can aim consistently (group), he cannot get a proper battle zero. Without a proper zero he cannot learn to hold off for range, weather and target motion. Unless he detects, rapidly and efficiently, his battle target, no amount of purely shooting skill will avail him aught, and so on. Everything in TRAINFIRE supports and is tied to the above points in a clear manner. Therefore, the trainee can start with them and reintegrate the whole course for himself. He can, then, if he wants to, pick out the tough problems and think of their solutions in relation to any kind of imaginable situation.

The problem of supplying the good instructor will be with us to the very end, I am sure. But, whatever may be the skill level of a given instructor, the use of that skill is ultimately dependent upon his daily motivation.

From HumRRO experience, I will say that a course carefully constructed along the lines of the principles that I have just enumerated and illustrated has as much effect on the motivation of the instructor as it has upon that of the trainee. For as the instructor sees the skills and knowledge of his trainees growing daily, as he sees their pride and *esprit* build up, he himself becomes inspired to greater effort. We get an interaction here. The instructor and the trainees begin to motivate each other as the daily level of skill and enthusiasm continues to rise. No longer is the visit of the training inspector a dreaded thing; he becomes a sought-after audience.

These basic problems, and a host of others too numerous to mention, clearly underlie the kind of *ad hoc* problem with which we grapple in training research today. This is particularly true with regard to problems involving motivation and leadership, and especially motivation. Our speed and effectiveness in continuing to solve the many crucial military training problems which will confront us in the space age is dependent upon a fund of basic knowledge that we have just begun to generate.



Mutual Fund Sales Charges

by W. Mac Stewart*

There has been some mild controversy in the Military recently concerning the relative advantages of the two types of mutual funds known as "front load plans" and "level load plans"—caused by a lack of understanding, even on the part of some high military officers, of mutual funds. Let's examine the facts:

The plans referred to are monthly investment plans for purchasing mutual fund shares. The term "load" refers to the sales charge. This takes the place of the brokerage fee you pay when you buy and sell individual issues—yet unlike a brokerage fee, it is paid only once: at the time you buy. In a "level load" fund, sometimes called a "voluntary" plan, each monthly investment carries the same sales charge percentage. In a "front load" fund, sometimes called a "contractual" plan, a large part of the sales charge (usually half) is deducted from the first 12 payments, and the balance spread over the life of the plan (usually ten to 12½ years). The term "contractual" is misleading, as the investor makes no contract, other than with himself, to complete the plan. However, he is told when he starts such a plan that liquidation in the early years is apt to result in a loss to him.

By way of illustration, let's assume you are investing equally in a plan of each type, each with a sales charge of 8½%. In the level load plan, 8½¢ of each dollar you invest for the entire life of the plan is deducted as sales charge. In the front load plan approximately 50¢ of each dollar you invest is deducted from the first 12 payments, but only 4¢ to 4½¢ per dollar is deducted from subsequent payments. Your break-even point is likely to be reached sooner with the level load plan, but the front load plan will gradually catch up. By the time you complete both plans you will have paid exactly the same amount of sales charge on each.

At first glance, it would appear that the level load plan is the better deal. And this is true if you plan on liquidating your shares soon after you start your program, because you are almost certain to take a greater loss if you liquidate your front load plan in the first two to three years. However, the final results to you, the investor, will be approximately the same from each type of program if you carry them both through to completion. To prove this, one fund recently computed performance tables of their own plan, applying both level load and front load factors. Payments of the same amounts were assumed to have been made on both plans on the same days. On monthly investments totalling several thousand dollars over a period of ten years, the final results were within five dollars of each other!

However, there are so many variables that no valid table or chart could ever be established comparing the two types of plans. Final results could depend on what day of each month the payments were made. A change of even one day could swing the end results in favor of one plan or the other. Further, market action has a big effect. If the market dropped during the life of the plan on a straight diagonal line with no fluctuations (an impossibility), a front load plan would show superior results. Conversely, if the market made an equally-impossible straight line rise during the life of the plan, the level load plan would be superior. But the constant in-between fluctuations during any rise or decline is the great equalizing factor. Therefore, it is impossible, except in abstract theory, to determine whether a front load or level load plan will produce higher earnings and growth.

However, when comparing these two types of plans we must also consider the purpose for which we are investing—our long range goal. A mutual fund must always be considered a long term investment, and every fund underwriter advises you not to undertake a monthly investment plan unless you sincerely intend to complete it. What has been the record of the two types of plans on that score? Statistics show that voluntary plans, including level load funds and the N. Y. Stock Exchange's monthly investment plan, have a 60% delinquency rate. That is, 6 of each 10 persons who started such plans have either dropped them entirely or are more than six months behind in their payments.

By contrast, front load mutual funds have only a 10% delinquency rate. Nine of each ten investors in those funds are still investing regularly, still building toward their original goals. The reason for this is obvious: Since, in a front load plan, you will be behind (that is, the value of your holdings will be less than you have paid in) for perhaps two or three years, the temptation to drop your plan is considerably less, and you keep right on making your regular monthly investments. (This is the same principle as building the cash value in your

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commercial life insurance). Then, by the time your fund investment has reached the break-even point, you have firmly established the saving and investing habit, and you never stop. Industry figures show that 90% of front load investors will complete their investment programs, compared to less than 40% of voluntary plan investors.

It has been shown many times that to be truly successful a periodic savings or investing medium should have both "penalty" and "reward" factors to encourage the individual to carry on with the good intentions he had when he started his plan. For example: U. S. Savings Bonds have an extremely low rate of return if cashed before maturity. It is a number of years before the cash value of most life insurance policies equals the premiums that have been paid.

This column does not presume to claim one type of fund is superior to the other. Nor do we wish to add fuel to the long-standing and insolvable argument over which is best. We do hold, however, that for the average investor *any* well-managed common stock fund, or balanced fund with heavy common stock holdings, is a sound long range investment medium —whether it is a front load or level load plan.

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$6 million to **Hayes Aircraft Corp.** for organizational and field maintenance on roughly 254 fixed-wing and 306 rotor aircraft.

$9 million to **Radioplane Div., Northrop Aircraft** for low speed and support drones.

$5.2 million to **Raytheon Mfg. Co.** for work on the Hawk ground-to-air missile system.

$6.3 million to **Bendix Aviation Corp.** for proximity fuses.

$6 million to **Chrysler Corp.** for Redstone missile components.

$380,000 for development of two wheeled amphibians with five and fifteen ton capacities, designed to replace the World War II DUKWs.

$2.4 million to **Thiokol Chemical Corp.** for development of a self-destroying unit for Nike-Hercules missiles.

$1 million to **Philco Corp.** for installation of two inter-battery microwave communications systems between Nike missiles sites and anti-aircraft operation centers.

NAVY

$65 million to **Goodyear Aircraft Corp.** for research and development work on Subroc, an antisubmarine missile which can be fired from above or below the surface.

$29 million to **Bendix Aviation Corp.** for advanced engineering and production of the Talos missile.

$10.3 million to **Sperry Gyroscope Co.** for production of weapon direction equipment for Talos-armed ships.

$11.9 million to **General Electric Co.** to design and furnish long lead-time reactor compartment components for the guided missile nuclear-powered frigate.

$19 million to **Sperry Gyroscope Co.** for field test and radar equipment for Terrier guided missile ships.

$8 million to **Sperry Gyroscope Co.** for long lead-time items to be used with Talos missile radar.

$15 million to **Raytheon Mfg. Co.** for radio communications relay sets for the Marine Corps.

$3.5 million to **Peterson Builders, Inc.** for one wood ocean minesweeper.

$3.3 million to **Tacoma Boatbuilding Co., Inc.** for two wood coastal minesweepers.

$1.2 million in two contracts to **Telecomputing Corp.** for advanced electronics equipment.

AIR FORCE

$320 million to **Boeing Airplane Co.** for B-52 bombers already programmed.

$65 million to **Northrop Aircraft** for Snark intercontinental air-breathing missiles.

$16.2 million to **Allison Div., General Motors Corp.** for product support engineering services for J33, J71 and T56 engines.

$13.8 million to **Ford Instrument Co.** for navigational computer sets.

$2.1 million to **Allison Div., General Motors Corp.** for gas turbine engines.

$2 million to **Bell & Howell Co.** for JAN projectors.

$4 million letter contract to **McDonnell Aircraft Corp.** for F-101B production. The definitive contract is estimated at $80 million.

$3.9 million to **Curtiss-Wright Corp.** for product improvement on the J65 engine.

$1 million to **Convair-San Diego** for the sled-test program of canopy and interim ejection seats for the F-106B.

$1.3 million to **Garrett AiResearch Mfg.** for F-100 and KC-135 starters.

$1.2 million to **Lycoming Div., Avco Mfg. Corp.** for O-480-1 reciprocating engines.

$1.9 million to **Aerojet-General Corp.** for process improvement studies pertaining to high-energy fuels.

$3 million to **Sylvania Electric Products, Inc.** for antenna, receiver-transmitter, computer and frequency tracker equipment for jet aircraft.

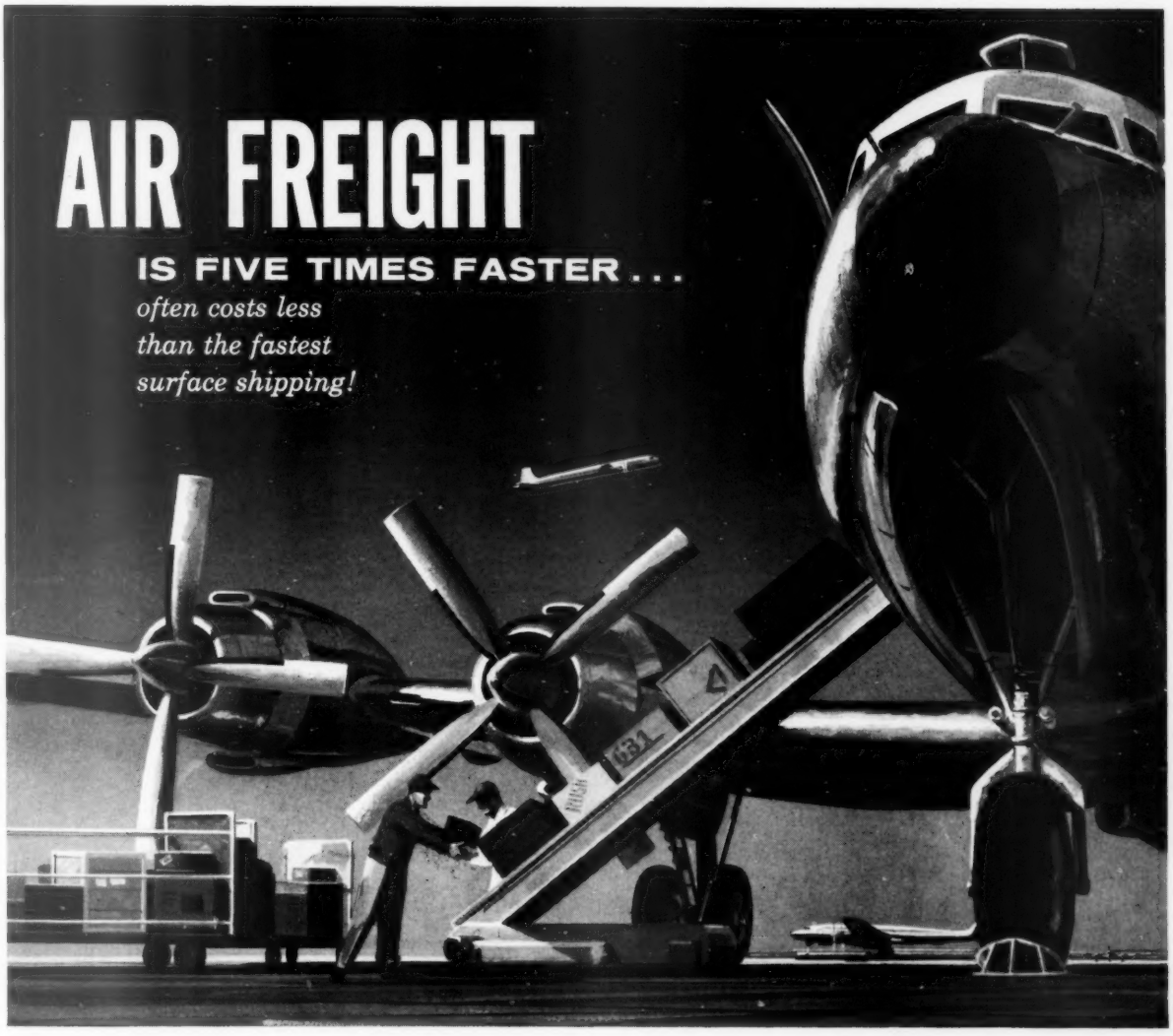
$1.6 million to **Wright Aeronautical Div., Curtiss-Wright Corp.** for aircraft and helicopter reciprocating engines.

$1.7 million to **Summers Gyroscope Corp.** for MM-3 and MM-4 indicators.

$1.5 million to **Chandler-Evans** for supporting parts on J47 engines.

$314.8 million to **Convair** for work on the Atlas ICBM in definitization of a letter contract.

$17 million to **General Electric Co.** for T58 engines.



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